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The original sin that started only later: How Austria-Hungary's paper debt turned golden, 1870s – 1913

By

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Abstract

Conventional wisdom has that most countries were not able to issue debt denominated in domestic currency before World War I. We show that Austria-Hungary had a vast external paper debt until the 1870s; only then became foreign residents reluctant to hold unsecured debt. Austria-Hungary attempted to counteract the repatriation of paper debt by issuing gold debt. As a result, the external debt became increasingly "golden" but the dual monarchy was a net exporter of capital in the period 1880-1913. This suggests that Austria-Hungary had been free from original sin initially but began to be affected by it in the 1870s. Based on a reconstruction of the balance-of-payments, we then demonstrate that a strong export performance and large remittances from emigrants counteracted capital exports and interest payments abroad and made gold standard adherence feasible.

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1. Introduction

Even in today's well-developed financial markets, the ability to borrow in domestic currency is limited to a small number of countries; the vast majority of them need to borrow in foreign currency if they wish to tap international capital markets.[1] This inability to borrow in domestic currency has become known as 'original sin'. Despite intensive research efforts since the seminal paper of Eichengreen and Hausmann[2], opinions differ as to why there is original sin (i.e., why markets do not provide financial instruments other than foreign exchange clauses to insure against perceived risk from sovereign borrowers), why it affects so many countries and what could be done to overcome it.

Economic historians have shown that original sin was also an issue in the past, and probably an even bigger one given that financial markets were less developed than they are today. In an early economic history contribution to the original sin debate, Bordo and Flandreau argued that, in the period 1880-1914, only eight countries had been able to issue sovereign bonds in terms of their own currencies (US, UK, France, Germany, the Netherlands, Belgium, Denmark, and Switzerland).[3] More recent research has enlarged the list of countries not affected by original sin somewhat. In a detailed case study, Flandreau&Sussman have shown that Russia, for instance, was able to circulate its paper bonds abroad despite its persistent inability to fix its exchange-rate and not being a core country in the pre-World War I financial architecture.[4]

In establishing whether a country was affected by original sin or not, current research checks government bonds quoted at foreign stock exchanges and asks whether they contain foreign exchange clauses (usually payment in British pound, French franc or German mark, but potentially also in Dutch forint) or gold clauses (i.e., payment in specie even if specie payment had been suspended internally). If government bonds listed abroad fulfil either of these two conditions, a country is considered to be affected by original sin. In proceeding along these lines, original sin becomes a binary choice: either a country is affected by it or it is not. In other words, this research approach completely overlooks that

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[1] Cf. editors' introduction to Eichengreen and Hausmann, eds., *Other people's money: Debt denomination and financial instability in emerging market economies* (Chicago: Chicago University Press,2005).

[2] ———, "Exchange rates and financial fragility," in *New Challenges for Monetary Policy*, ed. Federal Reserve Bank of Kansas City (Kansas City (MO): 1999).

[3] Bordo and Flandreau, "Core, periphery, exchange rate regimes, and globalization," in *Globalization in historical perspective*, ed. Bordo, Taylor, and Williamson (Chicago: University of Chicago Press, 2003), p. 439.

[4] Flandreau and Sussman, "Old sins: Exchange clauses and European lending in the nineteenth century," in *Other people's money: Debt denomination and financial instability in emerging market economies*, ed. Eichengreen and Hausmann (Chicago: University of Chicago Press, 2005).

different countries might have been affected by original sin to different degrees. Some sovereign borrowers might have circulated their paper bonds abroad as freely as their gold bonds, while for others paper bonds might have been an unimportant side-show to a vast gold debt circulating abroad. If we only look at government bond quotations at foreign stock exchanges, we will never be able to differentiate between the two as much as we would like to.

This paper follows a different approach which will provide us with a more nuanced picture of original sin during the period 1870-1914. The Austro-Hungarian government tracked sovereign debt held abroad (as well as private debt held abroad) from the late 1870s to World War I with great accuracy. Their very sincere work was motivated by the desire to establish whether the dual monarchy was able to join and, later on (i.e., after the gold standard legislation of 1892), to maintain the gold standard. The enormous data collection they produced over three decades are, to our knowledge, unrivalled by any other government at the time and they certainly confirm the stereotype of the dual monarchy's pedantic bureaucracy so often ridiculed by writers such as Robert Musil and Franz Kafka. As modern economic historians we can only be grateful for the wealth of sources they left behind. We can ascertain not only which fraction of government debt was held abroad, but the data also allow us to distinguish between paper bonds (i.e., bonds issued in domestic currency) and gold bonds (i.e., bonds protected by foreign exchange clauses and/or gold clauses).

Based on this very rich and detailed source material, we are thus in a position to establish the amount of gold debt and paper debt held abroad from the late 1870s to the outbreak of World War I. This reconstruction will result not only in a more detailed account of the Austro-Hungarian experience, but in a revised view on the issue of 'original sin'. One of the themes of the original sin literature is that countries can mature from original sin. Bordo&Meissner&Redish, for instance, show that the US, Canada, Australia and New Zealand were initially all affected by original sin but they also demonstrate what it took to overcome this hurdle.[5] The idea that a sovereign borrower might be free from original sin initially but suffer from it later on has, to the best of our knowledge, not yet been contemplated in the literature. But this is precisely what our data point to: Austria-Hungary was able to circulate its paper debt abroad relatively freely until the mid-1870s; our data show that more than one third of its paper debt was held externally. Of equal importance, the share of paper debt as part of total external government debt was 39.2% (in the mid-1870s). This achievement is even more remarkable given that

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[5] Bordo, Meissner, and Redish, "The evolution of external debt denominated in domestic currency in the United States and the British dominions, 1800-2000," in *Other people's money: Debt denomination and financial instability in emerging market economies*, ed. Eichengreen and Hausmann (Chicago: University of Chicago Press, 2005).

the exchange-rate had been floating – with one short-lived attempt to return to specie convertibility in 1859 - since 1848.[6] Conditions then deteriorated with massive capital repatriations of paper debt which would continue until World War I. By 1913, the proportion of paper debt held abroad had declined to 4.9%.

Our data indicate that Austria-Hungary suddenly in the mid-1870s found itself affected by original sin. As a result, the dual monarchy was in a position far worse than those countries which had never had any choice than issuing their debt in foreign currency or protected by specie clauses. The massive sell-off of Austro-Hungarian government paper securities by foreign bondholders threatened to open a vicious circle: repatriation of paper debt would put the exchange-rate under pressure, making further sell-offs more likely, which, in turn, would put the exchange-rate under further pressure. In this situation, Austria-Hungary was left with only one choice. It had to play by the new rules of the game and start issuing gold bonds of its own. These bonds became known as the 4% Austrian gold bond and the 4% Hungarian gold bond and were first issued in 1876 and 1881, respectively. The gold bonds were a great success not only in that they had lower yields but, crucially, approximately 80% of them were held externally. Even if this meant substantial capital inflows into Austria-Hungary, our data show that the inflows associated with the new gold bonds did not compensate for the capital outflows due to the old paper bonds. In other words, Austria-Hungary, from 1880 to 1913, was capital exporter rather than capital importer; while the total amount of government debt held abroad declined only slightly over time, the real change occurred in the composition of the external debt: the share of paper debt as part of total external debt declined from 39.2% in the late 1870s to less than 5% in 1913. By 1913, Austria-Hungary's earlier ability to circulate its paper debt abroad had almost completely vanished.

Structure of the paper

The remainder of this paper is structured as follows: In the second chapter we will show the structure of the government debt. We will show that paper debt circulated widely abroad in the 1870s, albeit to a lower degree than debt denominated in foreign currency (either French franc or German mark) or protected by a silver clause. We will then show how the ability to convince foreigners to hold paper bonds declined over time: while more than a third of paper debt was held abroad in the 1870s, this fraction declined dramatically to less than 5% in 1913. Our data will also show that not even Austria-Hungary joining the gold standard in 1892 put an end to this process of massive capital repatriation.

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[6]   Kamitz, "Die österreichische Geld- und Währungspolitik von 1848 bis 1948," in *Hundert Jahre österreichischer Wirtschaftsentwicklung 1848 bis 1948*, ed. Mayer (Vienna: Springer, 1949).

Doubts about Austria-Hungary's ability to maintain gold adherence lingered on, as evidenced by spreads between paper and gold bonds, and so did the sell-off of paper debt by foreign bondholders.

The third chapter asks what the Austro-Hungarian authorities undertook to deal with the increasing difficulties to keep paper debt in foreign markets. In the view of the Austrian and the Hungarian Ministers of Finance (each part of the dual monarchy had separate governments), the difficulties to retain paper debt in foreign circulation were connected to ever more countries converging on the gold standard in the 1870s. The implication of this analysis was a speedy transition to the gold standard but this policy objective remained elusive until the early 1890s due to adverse macroeconomic conditions and disagreements between both governments. What both governments could do in the meantime was to issue gold bonds as a means of stopping the capital outflows and as a step towards future gold standard adherence; which is what they did as early as 1876.

The fourth chapter will assess to what extent this policy was successful: did issuing gold bonds reverse capital outflows? Our data show that the newly issued gold bonds were successful in conquering foreign markets, with approximately 80% being held abroad. But their volume was not large enough to fully compensate for the ongoing repatriation of paper bonds; Austria-Hungary exported rather than imported capital.

Our finding that Austria-Hungary was a net-exporter of capital between 1892 and 1913 is in contrast with two ideas cherished by economic theorists and economic historians alike: first, the idea that capital should flow from rich to poor countries[7] (the main creditors Germany, France, the Netherlands and Belgium were all richer than the dual monarchy); and, second, the idea that adherence to gold increased capital imports.[8] If capital imports were in fact negative, what then kept the balance-of-payments in equilibrium? Explaining this conundrum is the focus of chapter 5, where we reconstruct the Austro-Hungarian balance-of-payments on an annual basis for the period 1880-1913. Our key finding will be that gold standard adherence was made possible, in its first decade, by a continuously

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[7] Daudin, Morys, and O'Rourke, "Globalization, 1870-1914," in *The Cambridge Economic History of Modern Europe*, ed. Broadberry and O'Rourke (Cambridge: Cambridge University Press, 2010). The opposing view is often referred to as the Lucas paradox, cf. Lucas, "Why doesn't capital flow from rich to poor countries?," *American Economic Review* 80(1990).

[8] Most of the gold standard literature is concerned with bond spreads but the argument is wider, i.e. that gold standard adherence improved capital market conditions both in terms of price and volume. The focus is bond spreads in actual research is largely due to poor data on the volume of capital exports for most countries, as acknowledged in Bordo and Rockoff, "The Gold Standard as a 'Good Housekeeping Seal of Approval'," *Journal of Economic History* 56(1996). For the discussion on bond spreads cf. also Flandreau and Zumer, *The Making of Global Finance. 1880 - 1913* (Paris2004). Ferguson and Schularick, "The Empire Effect: The Determinants of Country Risk in the First Age of Globalization, 1880-1913," *Journal of Economic History* 66, no. 2 (2006).

positive trade balance; after the turn of the century, remittances from emigrants grew in importance and replaced trade surpluses as the most important financial inflow into the dual monarchy.

Chapter six summarises and concludes.

2. Paper and silver debt held abroad

Reconstructing the Austro-Hungarian government debt

The main argument of this paper is that Austria-Hungary initially could circulate debt denominated in its own currency abroad but that it encountered increasingly less receptive foreign bond markets from the mid-1870s onwards. Austria-Hungary started off as a sovereign borrower free from original sin but later on became affected by it. In this chapter we set out to provide the empirical evidence to sustain this claim.

Two key features of the Austro-Hungarian government debt enable us to establish with great accuracy the amount of debt held abroad at a given point in time as well as to ascertain whether it was paper debt or gold debt: (a) that sovereign debt is accounted for by a small number of government bonds for each of which we know the key parameters (interest rate, maturity structure, coupon payments in gold or paper, etc.); (b) that the Austro-Hungarian bureaucracy established the overseas proportion of a given bond in regular intervals. We shall start with the latter, as this is what makes the sources left behind by the Austro-Hungarian bureaucracy unique.

There are two main methods[9] of establishing the overseas proportion of a given bond: coupon payments effectuated abroad and data relating to coupon renewals. We shall discuss the two methods in some detail, as differences between coupon payment data and coupon renewal data will prove insightful to appreciate why so much Austro-Hungarian paper debt circulated abroad.

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[9] A third way of determining the amount of bonds held abroad relies on data relating to the issue of the bonds. On many occasions, the government had an idea of what proportion of the total issue was actually placed abroad; this was especially true in cases where a foreign bank was actually handling the issue. The *Compass* lists plenty of such data relating to the issue of the bond. There are, however, serious shortcomings. Such data can, by its very definition, only be regarded trustworthy for the year of the issue itself. However, even for the year of issue, serious concerns are raised. In most cases, data of issue only cover bonds that have been placed abroad immediately, i.e. without passing into the hands of domestic residents and, more importantly, domestic commercial banks first. While this suggests that data of first issue are biased downwards, there is also reason to believe exactly the opposite. Bonds that are placed exclusively abroad are often subscribed to by domestic residents. To make matters worse, it is well known that the initial bond issue is often followed by intense trading in the secondary market. Therefore, data of first issue can be unreliable even for periods shortly after the initial issue. Taking all this together, data of first issue are to be treated with great caution.

The main advantage of coupon payments is that they allow us to establish the overseas proportion on a yearly basis. There are, however, several downsides to coupon payment data. First and foremost, there are bonds for which no coupon payments were effectuated abroad (cf. column 10 in table 1) but we know for certain that many of the bonds were actually held abroad. In these cases foreign bond holders had to send their coupons to Vienna or Budapest to receive the interest payments. But even if coupon data are available, the data need not necessarily be reliable for a number of reasons[10]: first, coupons were often used as a means of cross-border payment as they could easily be sent by mail. Second, many foreign bond holders had to pay (domestically) a tax on holding foreign bonds. Asking for coupon payment in their own country would have alerted the tax authorities. As a means of tax evasion, foreigners deposited Austro-Hungarian bonds at banks in Austria-Hungary where no such tax was levied. Whenever a coupon payment was due, the foreign bondholder would ask for it in Austria-Hungary; later on, he would transfer the money to his home country without declaring its origin as coupon payment. Finally yet importantly, in the case of some bonds, coupon payments were effectuated in different currencies at different places. The 4% Austrian gold bond (table 1, #4), for instance, paid 20 gold florins in Austria-Hungary, 50 francs in France, and 40.50 Marks in Germany (based on a bond of 1000 gold florins and two coupon payments per year).[11] If exchange rates deviated strongly from parity at a specific coupon date, coupons were sent to the place where they would bring the most.

The second method of establishing the overseas proportion of a given bond relates to the percentage of coupon renewals applied for abroad. Bonds had to be submitted to the Austro-Hungarian authorities in regular intervals; new coupons would then be handed out, which served as entitlements for future coupon payments. This process was known as "coupon sheet renewal" ("Couponbogen-Erneuerung"). As coupon renewal could take place domestically as well as abroad, the data can be used to establish the overseas proportion in regular intervals.[12]

Comparing the two methods with each other, it is important to note that two key arguments against the reliability of coupon payments ((a) coupons as a means of payment, (b) arbitrage, cf. above) do not apply to coupon renewal data. As coupon renewals were of an administrative nature only, bond holders asked for coupon renewal where it was closest and easiest for them; which was, in most likelihood, in

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[10] A detailed discussion of this issue can be found in k.k. Finanzministerium, *Tabellen zur Währungsstatistik*, 2nd ed. (Vienna: Kaiserlich-königliche Hof- und Staatsdruckerei, 1904).

[11] *Compass* 47 (1914), p. 19.

[12] Coupon renewals were carried out approximately every eight to ten years. Every single coupon renewal could stretch over several years.

their country of residence. We therefore believe that coupon renewal data provide the better indication as to the overseas proportion.

As mentioned above, the vast majority of Austro-Hungarian government debt is accounted for by a rather small number of government bonds. If (as explained in detail in appendix 1) we can establish the overseas proportion, the nominal value and the market value for a given bond, we are in a position to establish how much if it was held abroad; comparing the proportion held overseas over time, we can then establish whether a particular bond gave rise to capital imports or capital exports. By aggregating the data for all government bonds, we can subsequently establish the proportion of government debt held abroad at different points in time and, in turn, periods of capital imports and exports.

[table 1 about here]

How many government bonds do we need to cover the Austro-Hungarian government debt? In order to answer this question, we shall first distinguish between the three different components of the total government debt: (a) common debt, (b) Austrian debt, and (c) Hungarian debt. The common debt ("Gemeinsame Staatsschuld") was the debt accumulated until the *Ausgleich* of 1867 (i.e., the establishment of a separate Hungarian kingdom within what was subsequently referred to as the dual monarchy); the joint debt increased only slightly thereafter. After the *Ausgleich*, there was a common budget[13], an Austrian budget and a Hungarian budget. The later two would give rise to the Austrian and the Hungarian government debt.

The common debt is fully accounted for by three bonds. In 1868, all pre-existing paper debt was converted into the "4.2% Notenrente" and all pre-existing silver debt was converted into the "4.2% Silberrente". A similar conversion occurred in 1903 (into the "4% konvertierte einheitliche Rente"), but conversion was rejected by some bondholders so that all three bonds carry through to 1913 (table 1, bonds ##1-3).

Only two bonds are required to cover most of the Austrian government debt: the "4% oesterreichische Goldrente" and the "4% oesterreichische Kronenrente"[14], which were issued first in 1876 and 1881, respectively, and which received numerous subsequent capital increases (table 1, bonds ##4, 5). If we rely only on these two bonds and the three bonds representing the common debt, we cover, on average (1880-1913), 81.1% of the combined common and Austrian debt. Given a large wave

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13   The main expenditure of which was defence and the main income of which were the customs duties.
14   Name since 1893. Prior to the conversion of 1893, the bond was known as „5% österreichische Notenrente".

of railway nationalisations starting in the 1880s (the debt of which was henceforth considered part of Austrian government debt), we deemed it safe to include 15 more Austrian bonds most of which related to the bonds of the nationalised railways (table 1, ##6-20).[15] If we increase the Austrian government debt to 17 bonds, we are in a position to increase the average cover ratio from 81.1% to 92.2%.

The Hungarian case is very similar to the Austrian one in the sense that two bonds alone cover most of the debt, i.e. the "4% ungarische Goldrente" and the "4% ungarische Kronenrente"[16] (table 1, ##21, 24). As data were readily available, we included two further (gold-denominated) issues of 1910 and 1913, respectively. These four bonds combined cover, on average, 70.0% of the total Hungarian government debt.

Thus, 24 bonds (cf. table 1) are used to represent the joint, the Austrian and the Hungarian government debt. The average cover ratio is 85.2%, with the minimum value at 78.8% (in 1893).

Analysing the Austro-Hungarian government debt

To understand the development of government debt in the 1870s, we need to look at bonds ##1, 2. While the interest rate (5% before taxes and 4.2% after taxes) and the maturity structure (both were perpetual bonds) were the same, the key differences was that payment of the silver rente was guaranteed by a silver clause (coupon payment "in klingender Muenze", as the Austrian sources say), whereas coupon payment of the paper rente was effected in what was legal tender at a particular point in time. Let us recall that Austria (and Austria-Hungary after 1867) was in theory on a silver standard but had suspended specie payment in the wake of the 1848 revolution and, in turn, declared bank notes as legal tender ("Zwangskurs").[17] Despite repeated efforts to return to specie convertibility (with a very short-lived success in 1859), this poor state of affairs continued until the gold standard legislation of 1892 was passed.

Before turning to coupon renewal and coupon payment data, we shall turn to the conditions surrounding both bonds: can we infer that the "Notenrente" was meant primarily for a domestic audience whereas the "Silberrente" was targeted to domestic and foreign residents alike? The evidence is mixed. There are two arguments in support of a different target audience. First, coupon payments

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[15] Only #5 is a non-railway bond.
[16] Which was the "5% ungarische Papierrente" before conversion in 1892.
[17] Kamitz, "Die österreichische Geld- und Währungspolitik von 1848 bis 1948."

abroad were effected only for the silver rente[18]; second, coupons of the silver rente could be used to pay customs duties but this was not possible with coupons of the paper bond.

On the other hand, we have one indication suggesting that both rentes were designed to circulate inside as well as outside Austria's borders. Both bonds carried (in addition to the German language original) a routine translation in English, French and Dutch (!), thereby covering all tongues of the Western European creditors nations.[19]

Irrespective of what the original intentions of the debt managers were, both bonds quickly found themselves in the hands of foreign bondholders. They were quoted at all major German stock exchanges (Berlin, Frankfurt, Hamburg, Leipzig, Muenchen, Breslau, Augsburg), in London, Paris, Amsterdam and Brussels. Most interesting – and the only reliable indication to establish the precise quantity held abroad – is what happened when it came to the first wave of coupon renewals, scheduled for 1879 (i.e., ten years after the conversion of both rentes in 1868). Even though coupon payments were effectuated abroad only for the silver rente, the debt administration came under pressure to allow coupon renewal abroad for both bonds; which suggests substantial holdings of Austro-Hungarian paper debt abroad. Figure 1 shows the coupon renewal data for both the paper and the silver bond and compares it with the coupon payment data for the silver rente. Coupon renewals often stretched over several years which explains why the indicated overseas proportion often remains constant for several years.

[figure 1 about here]

Figure 1 calls our attention for at least three reasons: First, roughly one third (33.2%) of the paper rente were held abroad. The likely value for the period before 1879 was substantially higher; otherwise we would not have heard the many concerns of contemporaries over capital repatriations which we will discuss in the third chapter. Given that the nominal value of the paper rente was substantially higher (values for 1875: 2604.3 million crowns versus 1988.8 million crowns) and that the overseas proportion of the silver rente was 67.3%, this implies that some 39.2% of the external debt was paper debt in the mid-1870s. This is clear evidence that Austria-Hungary was relatively free from original sin

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[18] The Financial Yearbook "Compass" mentions coupon payments abroad for the first time in 1888 but this does not mean that it did not happen before.

[19] Information on the condition of individual bonds is provided in great detail in the Financial Yearbook "Compass". For the information listed in the paragraph above and below cf. Compass 12 (1879), 19 (1886), 21 (1888), 23 (1890), 47 (1914).

at this point in time. Having said this, figure 1 also shows that Austria-Hungary was not entirely free from original sin, as a comparison of both rentes shows: the silver rente circulated abroad to a much stronger degree, with the overseas proportion being roughly twice as high (67.3% versus 33.2%). This suggests that it was easier to circulate debt protected by a silver clause abroad. Interestingly enough, this difference in overseas holdings continues even after 1879 despite the fact that the Austro-Hungarian paper currency was of higher value than the Austro-Hungarian silver currency from that year onwards due to the ongoing depreciation of silver after the end of bimetallism.[20]

Second, the overseas proportion of both bonds was in permanent decline. This contrasts with the overseas proportion for the two key gold bonds in our sample, the 4% Austrian gold bond and the 4% Hungarian gold bond (table 1, ##4, 21). While these two gold bonds were held approximately to 80% by foreign residents with little change over time (figure 2 shows the overseas proportion of the 4% Austrian gold bond), the overseas proportion of the paper rente and the silver rente declined to 4.4% and 13.9%, respectively, in 1913. Neither the gold standard legislation (1892) nor the actual stabilisation of the exchange-rate (1896) halted this process of capital repatriation.

[figure 2 about here]

Third, in the case of the silver rente where we have both types of data available, the coupon payment data suggests an overseas proportion roughly half as compared to the coupon renewal data; by contrast, we do not find a similar discrepancy for the two gold bonds whose coupon payment and coupon renewal data suggest a roughly similar pattern (cf. figure 2 for the 4% Austrian gold bond). Explaining the difference between coupon renewal and coupon payment data is crucial to understand why such high percentage of silver bonds circulated abroad; it will also help us appreciate why the paper bond was in so high demand among foreign bondholders. We have mentioned above three reasons why coupon payment data might be misleading. The effect of tax evasion is hard to estimate, and tax evasion could potentially also distort coupon renewal data. As for arbitrage, we do not believe that arbitrage played a sizeable role, at least for the years after 1892: Austria-Hungary remained relatively close to parity once the gold standard legislation was passed. Most of the deviation is probably the result of using coupons as a means of payments. This could also explain the difference between gold and silver/paper denominated currencies. Paper and silver denominated bonds meant coupon payments

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[20] The Austro-Hungarian mints discontinued the minting of silver on private account in January 1879 in order to avoid a silver inflation.

in Austro-Hungarian currency. Therefore, foreign businessmen were keen on using these coupons as means of payment, while they were less inclined to accept being paid in paper/silver coupons themselves. This rationale also explains why, in the case of the paper rente, foreign bond holders could do without the ability to cash coupons in their country of residence. They would use the coupons themselves to effectuate payments in Austria-Hungary or, alternatively, they would sell them to people who needed to effectuate payments in Austria-Hungary. Things were different with gold bonds: Some of them were denominated in different gold currencies – as was the case for the "4% österreichische Goldrente" -, some of them were only denominated in foreign currency (most notably in franc and mark). Therefore, gold coupons were interesting for foreign businessmen both for effectuating payments to Austria-Hungary as well as receiving payments from Austria-Hungary.

These considerations suggest that the accumulation of external paper debt might well have been somewhat accidental. The size and the trading relations of the dual monarchy with Western Europe meant that there always was a need to have Austro-Hungarian currency readily available. Coupons could easily complement bills of exchange as a means of payment[21], explaining why paper bonds became attractive in the eyes of foreign bondholders. It is along very similar lines that Flandreau&Sussman explain the circulation of Russian paper debt in Western Europe before World War I.[22]

Last but not least, why were foreign bondholders not suspicious of partial default by a depreciating exchange-rate? Presumably the existence of a very sizeable external debt protected by a silver clause helped stabilise expectations. The hard currency debt – which amounted to 60.8% of total external debt in the mid-1870s according to our calculations above – induced a 'fear of floating' among the Austro-Hungarian authorities which made them reluctant to depreciate the exchange-rate strongly[23]; the fact that the average exchange-rate over mint parity in the 1870s was only 15.1% is probably supportive of this view.[24]

We conclude: Probably more as a result of circumstances than intention, Austria-Hungary had accumulated by the 1870s a large external paper debt which accounted for 39.2% of total external debt.

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[21] Which, from all what we know, remained the dominant means to settle cross-border payments. Cf. Denzel, "The European bill of exchange. Its development from the Middle Ages to 1914," in *Cashless Payments and Transactions from the Antiquity to 1914*, ed. Chaudhuri and Denzel (Stuttgart: Franz Steiner Verlag, 2008).

[22] Flandreau and Sussman, "Old sins: Exchange clauses and European lending in the nineteenth century."

[23] Bordo and Flandreau, "Core, periphery, exchange rate regimes, and globalization." show that this was a general pattern for floaters before World War I.

[24] Morys, "The Classical Gold Standard in the European periphery: A case study of Austria-Hungary and Italy, 1870-1913" (London School of Economics, 2006), p. 97.

The success of the external paper debt hinged, to a certain extent, on the external hard currency debt which induced a 'fear of floating', thereby making foreign bondholders less suspicious of exchange-rate risk. This equilibrium between paper and hard currency debt unravelled in the 1870s, leading to massive capital repatriation of paper bonds which would continue until World War I. Explaining these changes is what we turn to now.

3. Reversing capital repatriation: launching the 4% Austrian and Hungarian gold bonds

Governments are generally not inclined to discuss adverse bond market conditions for fear of exacerbating the problem, and Austria-Hungary is no exception to this rule. But internal documents reveal a great deal of anxiety over the capital repatriations facing the dual monarchy.

Many of these documents can be found in the 15-year long letter exchange between the Austrian Minister of Finance and his Hungarian counterpart over the question of the monetary standard, starting in 1876 and ending with the gold standard legislation of 1892. Both sides were aware that the suspension of specie payment (which would have been in silver rather than in gold anyway) and capital repatriation were linked with each other. Interestingly enough, this connection is already made in the opening letter from 1876[25], in which the Austrian Minister of Finance deplores the global move to gold. After pointing out to some very common arguments highlighting problems associated with the emergence of the gold standard (insufficient gold supplies, price deflation, missing exchange-rate stability to silver standard countries etc.), the Austrian Minister of Finance quickly turns to the specific problems the dual monarchy was confronted with. As the single most important issue, he emphasises that the emergence of the Classical Gold Standard had limited the opportunities for Austro-Hungarian government bonds to circulate in foreign markets and that ever more securities held abroad were returned to the dual monarchy.

In the second chapter we approached the issue of capital repatriation via volume but we can also do so via bond prices. A good way to assess the difficulty of retaining silver and paper bonds in foreign circulation is by measuring spreads of silver and paper bonds over gold bonds. As the first gold bond was issued in 1876, we can calculate such a bond spread for the first time the following year. Figure 3 shows bond spreads of paper and silver bonds over gold bonds for the period 1877 to 1888. Starting

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[25]   Austrian State Archive, 3660 / FM 1876, letter of the Austrian minister of finance to the Hungarian minister of finance, 23rd September 1876.

from low levels, the bond spread increased considerably over time, reaching approximately 70 basis points in the late 1880s.

[figure 3 about here]

Were the finance ministers correct in their assessment that the paper debt had been undermined by the increasing diffusion of the gold standard? Such a connection is not obvious, as Austria-Hungary found itself on a floating exchange-rate already before the mid-1870s, so little had changed in this regard. Crucially, however, the emergence of the Classical Gold Standard after 1873 meant the end of the stability between gold and silver which had characterised the period 1850-1873.[26] Silver started depreciating, with the gold-silver ratio falling from 15.5 : 1 to 18.4 : 1 in 1879; at the turn of the century, it stood at 33.3 : 1. As a result, debt with a silver clause was increasingly viewed as akin to paper debt. In the Austro-Hungarian case, the paper currency began to be of higher value than the silver currency in 1879, when the mint refused to coin silver on private account in order to avoid a silver inflation. Consequently, we see only a very small bond spread between paper and silver bonds in figure 3 (which had not been the case before 1873).

In the second chapter we argued that paper debt was held widely abroad, because the (even more sizeable) silver debt induced a 'fear of floating', thereby reassuring foreign holders of paper debt. If this explanation is correct, we also understand why capital repatriations started in the mid-1870s: As silver debt became de-facto paper debt, there was no longer hard currency debt to instil a healthy 'fear of floating' which would, in turn, reassure foreign investors. In a somewhat indirect way then the Austrian and Hungarian Ministers of Finance were absolutely right in their assessment that their sovereign debt had been undermined by the increased diffusion of the gold standard (a corollary of which was the declining price of silver).

In their letter exchange, both finance ministers agreed that transition to the gold standard would be the best solution to halt the repatriation of paper bonds. At the same time, they were well aware that gold convertibility was not possible given the poor economic performance of the dual monarchy, continuous government deficits and the large amount of state notes in circulation. These adverse macroeconomic conditions may be illustrated with some numbers. From 1873 to 1879, the Austro-Hungarian economy grew only by 1.3%, with 1.0% in the Austrian part and 2.0% in the Hungarian

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[26]   Flandreau, *The Glitter of Gold. France, Bimetallism, and the Emergence of the International Gold Standard. 1848-1873* (Oxford: Oxford University Press, 2004).

part. The exchange-rate averaged 15.1% over mint parity in the 1870s and the governments were forced to monetise 31.5% of their government debt in that decade.[27] But macroeconomic factors were not the only (and probably not even the decisive) factor why Austria-Hungary postponed the transition to the gold standard into the early 1890s; it appears that the Austrian side wanted to join much earlier but was held back by Hungary which was plagued by substantial budget deficits until the late 1880s.[28]

If no consensus on the speedy transition to gold monometallism could be found, then both governments were left with only one choice: they would issue gold bonds themselves. Realising the scale of the problem, both governments acted very quickly: Austria issued its 4% gold bond as early as 1876 and Hungary launched its 5% gold bond the following year (which was converted into a 4% gold bond in 1881). In the next chapter, we will ask how successful these bond issues were and whether they were able to stop, or even reverse, the capital outflows facing the dual monarchy.

4. Changing the colour of the external debt: from paper debt to gold debt

We can use the methodology already employed in chapter 2 now to establish the amount of gold bonds and paper bonds held abroad over time. As our data do not go further back than 1879, we will track the external government debt from 1880 to 1913.

As table 1 shows, the 4% Austrian gold bond was the first genuine sovereign gold bond, to be followed by the Hungarian gold bond. We discard two large railway bonds in this context (table 1, ##17, 18), as they became part of government debt only in 1910 due to nationalisation.[29] The Austrian and the Hungarian gold bond (table 1, ##4, 21) were then followed by several other gold bonds (table 1, ##7, 8, 10, 11, 15, 19, 20, 22, 23).

[table 2 and figure 4 about here]

Figure 4 shows the total amount of external debt, differentiating between gold and paper debt. As the silver clause was of no practical relevance after the 1870s decline in the price of silver (cf. above), we

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[27] Morys, "The Classical Gold Standard in the European periphery: A case study of Austria-Hungary and Italy, 1870-1913", p. 97.
[28] Ibid., pp. 105-11.
[29] In addition, they were not genuine gold bonds but bonds protected by a foreign currency clause (payment in French franc).

classify silver debt as part of paper debt. Table 2 presents the same data but allows for differentiating between individual subcomponents. To begin with, figure 4 demonstrates that the newly issued gold bonds were well-received by foreign bondholders. By 1880, 1573.6 million crowns of gold bond circulated abroad, compared with 2466.6 million crowns of paper debt (i.e., silver and paper debt). This suggests that approximately three quarter of the new gold bonds had been absorbed by foreign residents between 1876 and 1879. Over the next three decades, we witness a repatriation of paper debt (from 2466.6 million crowns to 773.8 million crowns) accompanied by an increasing external gold debt (from 1573.6 million crowns to 2776.4 million crowns). While the silver/paper debt still accounted for 61.1% of total external debt in 1880, this share had fallen to 21.8% in 1913.

Our results also show that capital imports due to gold bonds did not compensate for the capital outflows related to paper debt. This is true both for the entire period 1880-1913 (outflow of 445.0 million crowns) as well as for the two sub-periods 1880-1891 (-226.8 million crowns) and 1892-1913 (-218.1 million crowns), i.e. under gold. This was largely due to the vast common debt (all of which was paper debt, cf. chapter 2) which kept being repatriated; while Austria and Hungary, individually, were able to attract foreign capital also for paper bonds (Austria: 55.2 million crowns; Hungary: 187.0 million crowns), these inflows were far outweighed by the outflows associated with the common debt (-1882.0 million crowns).

Moreover, our data do not suggest that we should see the gold standard legislation of 1892 as some kind of structural break (nor the actual stabilisation of the exchange-rate in 1896); neither were capital imports due to gold bonds higher after 1892[30] nor do the capital repatriations of paper debt slow down after 1892. Only if we look at bond spreads of paper bonds over gold bonds, do we get the impression that the gold standard legislation improved financial market conditions for the dual monarchy. Figure 5 shows that the bond spread more than halved after 1892, reflecting increased investors' confidence in the lasting success of the currency stabilisation.

[figure 5 about here]

To conclude: The newly issued gold bonds were well received by international financial markets. Despite their success, however, Austria-Hungary was a net exporter of capital due to massive repatriation of silver and paper debt which continued until 1913. Capital repatriation and interest

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[30] Which is true especially when taking into account that 1573.6 million crowns of gold debt had found its way abroad between 1876 and 1879, cf. above.

payments on foreign debt were then always a major burden on the capital account and, more broadly speaking, the Austro-Hungarian balance of payments. This raises the question what kept the Austro-Hungarian balance-of-payments in equilibrium for such a long time. This is what we turn to now.

5. A reconstruction of the Austro-Hungarian balance-of-payments, 1880-1913

If we want to know what kept the balance-of-payments (henceforth bop) in equilibrium despite persistent capital repatriations and interest payments effectuated abroad, we need to reconstruct the bop comprehensively. For most countries, such a reconstruction is virtually impossible for the lack of adequate data. Any bop for the period 1880 – 1913 is largely influenced by three statistical "heavyweights": (1) the balance of trade, (2) capital imports and interest payments effectuated abroad, and (3) – in the case of countries such as Austria-Hungary – remittances of emigrants. Out of these three main components, for most countries we have reliable data only for the balance of trade.

Austria-Hungary proves an exception to the rule for the same reason we already mentioned. The sources we have relied on for the capital movements also contain highly accurate information for the other entries of the bop. We were thus able to collect data for (1) the balance of trade, (2) capital movements and interest payments effectuated abroad (i.e., including non-government debt), (3) remittances, (4) interest and dividend payments of foreign governments and companies in Austria-Hungary, and (5) transport and tourism. Appendix 1 contains an in-depth description of the sources and our calculation.

[table 3 about here]

Table 3 shows the individual entries as well as the sum of the Austro-Hungarian balance of payments. If we want to make inferences from our estimates, we have to be reasonably confident in our results. In a system of fixed exchange rates, the reserve changes of the central bank should be identical to the sum of all other components of the bop. Figure 6, therefore, not only shows our estimate for the bop aggregate, but also the reserve changes of the Austro-Hungarian bank. Theoretically, both lines should be identical, but we would at least expect them to be reasonably close to each other. This is the case, especially after 1896 when mint parity was achieved and maintained until World War I; ups and downs of our aggregate estimate show the same pattern as the end-of-year changes of the currency reserves.

[figure 6 about here]

To put this approach on a more quantitative basis, we measure the average annual deviation between the reserve changes and all other components; we then compare the average annual deviation with the assets and the liabilities of the bop. This means the average annual deviation is 100.4 million crowns which compares to an annual inflow / outflow of approx. 4,000 million crowns. This implies that we have a margin of error of approximately 2.5%.

Our reconstruction shows where the positive entries to the bop come from, i.e. inflows that were needed to offset the capital repatriations and interest payments abroad: first, Austria-Hungary enjoyed a positive balance of trade without interruption until 1907. In some years the trade surplus was so high that it alone could pay for the interest payments abroad.

Even more significant is probably the overarching importance of remittances to the bop, specifically after the turn of the century. De Cecco, in his description of the Italian financial system from 1861 to 1914, labelled the remittances with good reason a *deus ex machina*[31], and recent research has shown that they were crucial in enabling gold standard adherence for peripheral countries before World War I.[32] From 1911-13, the heyday of emigration from Austria-Hungary with an annual outflow of 200 000 people, remittances were twice as large than interest payments abroad. The very obvious importance of remittances has led us to break down the assets of the bop into its individual components, i.e. export earnings, remittances, and transport and tourism. Figures 7 shows that the relative contribution of remittances (as well as of tourism related earnings) increased over time; in the years immediately before World War I, they account for approximately 20% of all inflows into the dual monarchy.

[figure 7 about here]

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[31] Cf. the editor's introduction to de Cecco, ed. *L'Italia ed il sistema finanziario internazionale. 1861-1914*, Collana storica della Banca d'Italia. Serie "Documenti". Volume I (Rome: Editori Laterza,1990), p. 25.

[32] Esteves and Khoudour-Castéras, "A Fantastic Rain of Gold: European Migrants' Remittances and Balance of Payments Adjustment During the Gold Standard Period," *Journal of Economic History* 69, no. 4 (2009).

6. Conclusions

This paper is a contribution to the original sin literature which argues that most countries were not able to issue debt denominated in domestic currency before World War I. Based on a unique data set, we showed that Austria-Hungary, a semi-peripheral country at the time, had a vast external paper debt until the 1870s; the ability to circulate paper debt abroad was enhanced by the existence of a parallel external silver debt, which induced a 'fear of floating' and, in turn, reassured foreign investors that exchange-rate movements would stay within reasonable limits. This also explains why the massive wave of capital repatriation began in the mid-1870s: as silver depreciated after the end of bimetallism, silver debt became de-facto paper debt, thereby alarming foreign bondholders. The analysis of contemporaries that the emergence of the Classical Gold Standard had undermined Austria-Hungary's external debt was thus correct.

We then showed that Austria-Hungary attempted to counteract the repatriation of paper debt by issuing gold debt. Until 1913, paper debt was returned to the dual monarchy but capital flowed in as a result of the new paper bonds. As a result, the external debt became increasingly "golden". Comparing the composition of external debt in the mid-1870s and 1913, we concluded that Austria-Hungary had been free from original sin initially but then became affected by it; this suggests that one of the arguments in the original sin literature – i.e., that sovereign borrowers can mature from original sin without contemplating that the reverse process might also happen – is in urgent need of revision.

Despite the success of the newly issued gold bonds, capital repatriations of paper bonds outweighed capital imports associated with gold bonds. Austria-Hungary was shown to be a net capital exporter. This finding was true both for the period off gold (1880-1891) as well as for the period on gold (1892-1913). This raised the question what kept the balance-of-payments in equilibrium, if capital exports and interest payments abroad acted as a permanent drain on the capital account. Based on a reconstruction of the balance-of-payments, we demonstrated that a strong export performance and large remittances from emigrants kept the balance-of-payments in equilibrium and made gold standard adherence feasible.

There are two major implications of this paper for future research. They both circle around the question whether the evidence presented in this paper shows a general pattern or whether we are just dealing with the idiosyncrasies of a case study. First, how widespread was the external circulation of

paper debt for other countries? Mitchener&Weidenmier[33] have shown that many countries issued paper debt before World War I and future research will need to establish whether the specific bonds associated with the paper debt actually circulated abroad.[34] The intense research interest of the last decade in bond prices has normally focussed on one representative gold bond for each country (such as the 4% Austrian gold bond), thereby neglecting that most daily stock exchange reports of the period contain very many government bonds (some with and others without gold clauses). Double-checking cross-listings of one and the same paper bond across several European stock exchanges seems to be the way forward here. Second, we want to know whether other peripheral and semi-peripheral countries also exported rather than imported capital. Capital exports from the rich Western European countries to the rest of the world have been a big theme in economic history since Feis' seminal book[35] and there is probably only a need to rewrite the story at the margins (or at least think more clearly about the exact time frame in which capital exports happened). But if other countries could also initially circulate paper bonds abroad which were then repatriated, it seems likely that Austria-Hungary was not the only net capital exporter during the period 1880-1913.

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[33] Mitchener and Weidenmier, *Are hard pegs ever credible in emerging markets? Evidence from the Classical Gold Standard*, NBER Working Paper Nr. 15401 (Boston (MA)2009).

[34] This question is not answered by their research, as they are concerned with the original sin problem only incidentally. Their focus is on the price differential between gold bonds and paper bonds. As the data for paper bonds is taken from domestic sources, they do not claim that the bonds in question also circulated abroad. Only in a very limited number of cases do they mention that a paper bond was also traded abroad, as they do in the case of the Russian paper bond which they find quoted at the Amsterdam stock exchange.

[35] Feis, *Europe, the World's Banker, 1870-1914. An account of European foreign investment and the connection of world finance with diplomacy before the War* (New Haven, CT: Council on Foreign Relations, 1930).

Appendix 1: Balance of payments reconstruction: methodology and sources

The most important sources are firstly the "Tabellen zur Währungsstatistik", a superb data collection produced by the Austrian Ministry of Finance to monitor the efforts to join and, later on, to maintain the gold standard. There are two editions dated 1893[36] and 1904[37] (TzW-1 1893 and TzW-2 1904). The two editions[38] are complemented by the "Statistische Tabellen zur Währungs-Frage" of 1892 , which is the 0th edition of the "Tabellen zur Währungsstatistik" in all but in name (STW 1892).[39] Secondly, the 1917 article "Statistische Daten über die Zahlungsbilanz Österreich-Ungarns" by Bartsch, who worked in the Austrian Ministry of Finance (Bartsch 1917).[40] Working during World War I, Bartsch tried to collect as much relevant information as possible before it was lost forever. While these publications provide data for the entire dual monarchy, it is fair to say that the data on Austria are of substantially higher quality and reliability. This shortcoming is compensated, however, by two articles by Fellner, who provides data only for Hungary (Fellner 1908[41] and Fellner 1915[42]).

Data were collected for: (1) the balance of trade, (2) capital movements and interest payments effectuated abroad, (3) remittances, (4) interest and dividend payments of foreign governments and companies in Austria-Hungary, and (5) transport and tourism. In the following, we will describe the reconstruction of the bop, including an overview of the sources used. Appendix 2 contains an in-depth description of the sources.

The balance of trade

The balance of trade is well recorded throughout the entire period from 1880 to 1913. The available statistics offer different versions of the balance of trade, depending on exactly what items are to be included in the statistics. So-called "transitory trade" ("Transitverkehr") – items that enter Austria-Hungary only to leave it at another border point without any commercial activity in between – need to be excluded. The same is true for trade in precious metals and coins, as this category forms part of changes of international reserves of the Austro-Hungarian bank. The relevant components of the balance of trade in our context are "Spezialhandel" and "Veredlungsverkehr".

Capital movements and interest payments effectuated abroad

Sources

The reconstruction of capital flows (i.e. capital imports and capital repatriations) and interest payments effectuated abroad is usually the most difficult part of any bop reconstruction. Duties levied on international trade forced administrations to record imports and exports carefully, which makes the balance of trade reliable in most cases. No such compulsion existed for capital imports and capital repatriations. The prevailing spirit and practice of free capital movements was not conducive to the production of good statistics either.

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[36] k.k. Finanzministerium, *Tabellen zur Währungsstatistik*, 1st ed. (Vienna: Kaiserlich-königliche Hof- und Staatsdruckerei, 1893).

[37] ———, *Tabellen zur Währungsstatistik*.

[38] The 3rd edition of the „Tabellen", published from 1903 to 1906, remained incomplete. The data relevant in our context is not covered by the 3rd edition. Cf. ———, *Tabellen zur Währungsstatistik*, 3rd ed. (Vienna: Kaiserlich-königliche Hof- und Staatsdruckerei, 1906).

[39] ———, *Statistische Tabellen zur Währungs-Frage der Österreichisch-ungarischen Monarchie* (Vienna: Kaiserlich-königliche Hof- und Staatsdruckerei, 1892).

[40] Bartsch, "Statistische Daten über die Zahlungsbilanz Österreich-Ungarns vor Ausbruch des Krieges," *Mitteilungen des k.k. Finanzministeriums* 22(1917).

[41] Fellner, *Die Zahlungsbilanz Ungarns* (Vienna1908).

[42] ———, *Volkseinkommen* (Budapest1915).

Reliable statistics are more readily available in the case of Austria-Hungary. Since the mid-1870s, there was growing unease over massive capital repatriations. Contemporaries put the blame for this phenomenon partly on the Vienna stock market crash of 1873, and partly on Austria-Hungary's adherence to a paper standard at a time when the rest of Europe had moved on to gold. Whatever the reason behind the alleged capital repatriations, the widespread feeling that Austria-Hungary repatriated bonds rather than imported capital was sufficient motivation for the Austro-Hungarian administration to produce good statistics. Reliable statistics were also needed, as the mid-1870s witnessed the start of the lengthy Austro-Hungarian struggle to join the gold standard, which culminated in the 1892 legislation.

In addition to the sources mentioned above – STW 1892, TzW-1 1893, TzW-2 1904, Fellner 1908, Fellner 1915, Bartsch 1917 – the following sources were of particular relevance to the reconstruction of capital movements and interest payments effectuated abroad: first, the *Compass*, the most important financial yearbook in the dual monarchy, is vital to fill gaps as the more general sources mentioned above predominantly – though with notable exceptions - provide a spotlight on specific years (1891/1892, 1901/1902, and 1912/1913, respectively). Second, Bunzl's description of the pre-1914 Vienna bond market provides important information on bond prices (Bunzl 1914[43]). Several more sources of secondary importance were used on specific occasions. A detailed description of all sources can be found in appendix 2.

Methodology: Calculation of capital movements and interest payments effectuated abroad
The calculation of interest payments effectuated abroad and capital movements rely on two different types of data: Establishing the interest payments effectuated abroad requires knowledge of the *absolute volume* of the overseas proportion of bonds. By contrast, establishing the size of capital movements relies on *changes in the absolute volume* of the overseas proportion of bonds. While the *absolute volume* is already hard to establish, things are even more complicated when it comes to *changes in the absolute volume*. For this reason, the sources mentioned refrain from providing data on capital movements; instead, they confine themselves to data on interest payments effectuated abroad.

Disregarding capital movements, however, is a serious shortcoming of any bop investigation for two reasons: First, capital movements are likely to be of considerable size. Any omission would distort the overall picture. Second, a bop is nowadays reconstructed to answer crucial questions in economic history that are often intrinsically related to capital movements; for instance, did joining gold indeed attract more capital (cf. chapter 4)?

Therefore, we have developed a methodology to calculate capital movements on a yearly basis. We have been able to establish 24 government bonds, which represent the Austro-Hungarian government debt (cf. chapter 2).[44] In addition to the 24 time series covering the government debt, 6 aggregate time series could be reconstructed to cover all other forms of debt being held abroad: railway bonds (1 series), public bonds at the regional and local level (1 series), Austrian and Hungarian stocks and private bonds (4 series).

While the reconstruction of the capital movements relies on the aggregate of the 30 time series, the developed methodology applies individually to each of the time series under consideration. In the following, we will first describe the methodology; this is followed by specific remarks on individual

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[43] Bunzl, *Der Wiener Rentenmarkt. 1884 bis 1914* (Vienna: Manzsche k.u.k. Hof-Verlags- und Universitätsbuchhandlung, 1914).

[44] The Austro-Hungarian government debt consists of three distinct categories: (1) the joint debt („Gesamte Staatsschuld"), i.e. the debt of the dual monarchy as a whole; (2) the Austrian government debt; (3) the Hungarian government debt. Interest on the joint debt was paid by both governments, with Austria covering approximately 70% and Hungary covering the remainder.

components not discussed in chapter 2, i.e. railway bonds, public bonds at the regional and local level, and Austrian and Hungarian stocks and private bonds.

For each of the 30 time series under consideration, three pieces of information have been collected on an annual basis: the nominal value (NV; henceforth also called face value and par value), the overseas proportion (OP; henceforth also called percentage of bonds held abroad), and the market value (MV; henceforth also called bond price). In this section, we will explain how we have calculated the capital imports (and capital repatriations) and the interest payments effectuated abroad.

Capital imports and capital repatriations

Two cases need to be distinguished: (1) The nominal value in period 1, NV_1, is equal to or exceeds the nominal value in period 0, NV_0. (2) NV_1 is smaller than NV_0. The latter case is more complicated, as usual trading in the secondary market (i.e. trading after the initial bond issue) concurs with amortisation or partial cancellation of the bond. We shall therefore begin with the first case.

1. $NV_1 \geq NV_0$

$NV_1 \geq NV_0$ implies that no amortisation of significant size or partial cancellation of the bond took place in period 1. Bonds are newly issued ($NV_1 > NV_0$), and they are traded in the secondary market. While a new issue can only give rise to capital imports, trading in the secondary market can generate capital imports or capital repatriations. In order to determine the exact size of capital imports (or capital repatriations), we proceed as follows: multiplying NV by OP, the overseas proportion, gives the nominal value of bonds held abroad at a specific point in time. Subtracting the obtained value of bonds held abroad for two subsequent years, say period 1 and period 0, delivers the nominal value of overseas bonds in period 1 in excess of period 0: $NV_1 * OP_1 - NV_0 * OP_0$.

For the sake of reconstructing the bop, we are interested in establishing how much money flowed into Austria-Hungary in return for exporting bonds of ($NV_1 * OP_1 - NV_0 * OP_0$) nominal value in period 1. In order to obtain the correct value, $NV_1 * OP_1 - NV_0 * OP_0$ needs to be multiplied by MV_1, the market value, i.e. the bond price in period 1. Thus, ($NV_1 * OP_1 - NV_0 * OP_0$) * MV_1 represents the cash flow into Austria-Hungary as a consequence of capital exports. Multiplying with the bond price is not only the theoretically correct approach; such multiplication is needed in order to avoid an undue bias. In the case of a peripheral economy such as Austria-Hungary, bonds were often traded substantially below par, sometimes falling to 80% of the nominal value.[45] If such a sizeable difference between bond price and par value were not taken into account, we would seriously overestimate capital imports into Austria-Hungary.

2. $NV_1 < NV_0$

The need to differentiate between market value and nominal value is also the reason why the opposite case, i.e. $NV_1 < NV_0$, needs to be calculated in a slightly different way. $NV_1 < NV_0$ implies that some amortisation or partial cancellation of the bond took place in period 1. Payments due to amortisation or partial cancellation are settled at nominal value rather than market value. At the same time, any bond purchases or bond sales in the secondary market still take place at market value.

How can we differentiate between amortisation or partial cancellation, on the one hand, and trading in the secondary market, on the other? First, we need to determine the payments made to foreigners resulting from amortisation or partial cancellation of the debt. In total, bonds of ($NV_0 - NV_1$) nominal value were withdrawn from circulation. In order to obtain the resulting payments made abroad, we have to multiply this term by the percentage of bonds being held abroad the previous year. Thus, ($NV_0 - NV_1$) * OP_0 represents the money flow out of Austria-Hungary as a result of amortisation or partial cancellation of the bond. In this formula, we implicitly assume that domestic and foreign bondholders are subject to amortisation or partial cancellation in accordance with the overseas-domestic proportion

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[45] Bunzl, *Der Wiener Rentenmarkt. 1884 bis 1914*, appendix 2.

of bond holding; there is little reason why this should not be the case. Under alternative (1) (NV1 ≥ NV0), we were interested in the money flow into Austria-Hungary rather than the opposite. For reasons of consistency, we can do the same here by simply changing the sign. Thus, $(NV_1 - NV_0) * OP_0$ represents the (negative) money flow into Austria-Hungary as a result of amortisation or partial cancellation of the bond in question.

In a second step, we have to take the usual trading in the secondary market into account. As indicated above, the term $(NV_1 - NV_0) * OP_0$ implicitly assumes that the overseas proportion has remained constant despite amortisation or partial cancellation. As a result, cross-border trading of bonds in the secondary market can be inferred from changes in the recorded data of overseas proportion between period 1 and 0, i.e. $OP_1 - OP_0$. The nominal value of traded bonds is represented by $NV_1 * (OP_1 - OP_0)$. The corresponding money flow is obtained by multiplying this term with MV_1, the market value of the respective bond in period 1. Thus, $NV_1 * (OP_1 - OP_0) * MV_1$ represents the money flow into Austria-Hungary as a result of trading in the secondary market. Taking both money flows together, we obtain: $(NV_1 - NV_0) * OP_0 + NV_1 * (OP_1 - OP_0) * MV_1$

As two different money flows need to be distinguished, the formula for $NV_1 < NV_0$ is more complicated than for the opposite case of $NV_1 \geq NV_0$. This only reflects the need to distinguish between transactions at par value (amortisation or partial cancellation) and transactions at market value (trading in the secondary market). Under the assumption $MV_1 = 1$, i.e. when bonds in the secondary market are traded at par, the formulae for both cases are identical.

In conclusion, the capital imports are calculated as follows, with a positive value representing a capital import and a negative value representing capital repatriation:

$NV_1 \geq NV_0$: $(NV_1 * OP_1 - NV_0 * OP_0) * MV_1$
$NV_1 < NV_0$: $(NV_1 - NV_0) * OP_0 + NV_1 * (OP_1 - OP_0) * MV_1$

Interest payments effectuated abroad

As opposed to the calculation of capital imports, the calculation of interest payments effectuated abroad is straightforward: first, we need to establish the nominal value of a specific bond being held abroad: $NV * OP$. This product needs to be multiplied by i, the nominal interest rate. Interest payments effectuated abroad can hence be calculated as follows: $NV * OP * i$

Specific remarks on individual components

We have so far described how to calculate capital imports and interest payments provided we know (1) NV, the nominal value, (2) OP, the overseas proportion, (3) MV, the market value, and (4) i, the nominal interest rate. Establishing this did not prove easy and posed different problems for the four categories under investigation. Therefore we will comment on the individual components not yet covered in chapter 2, i.e. railway bonds (1 time series), public bonds at the regional and local level (1 time series), and Austrian and Hungarian stocks and private bonds (4 time series).

a. Private railway bonds

The preferred choice of foreign investors in 19th century Europe was the acquisition of government debt and railway bonds.[46] Private railway bonds account for 2957.0 million crowns (38.85%) of the debt held abroad in 1892. The equivalent number for 1913 – 1932.8 million crowns (21.87%) – is substantially smaller, but the decrease reflects nationalisations of railways rather than repatriations of

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[46] For the case of the United Kingdom cf. the authoritative study of Stone, *The global export of capital from Great Britain. 1865-1914. A statistical survey* (New York1999), p. 28. The data of Stone show that two thirds of British capital exports went into government obligations and railroad securities. Our own calculations for Austria-Hungary suggest an even higher number.

bonds. Bonds ##8 and 17-20 represent railways that were nationalised in 1908/1910, henceforth part of government debt. If we take public railway bonds and private railway bonds together[47], the overall railway debt held abroad amounts to 3250.7 million crowns (1892) and 3096.0 million crowns (1913). Given the enormous importance of railway debt to the bop, our sources contain reliable estimates for several benchmark years.[48] They suggest that the amount of railway debt held abroad remained remarkably stable at around 3,000 million crowns from 1880 onwards.

b. Public bonds at the regional and local level
Public bonds were not only issued by the government, but also at the regional and local level. As in the case of private railway bonds, we have reliable estimates for several benchmark years.[49] They suggest that the public bonds at the regional and local level as a share of debt held abroad rose from a very modest 1.82% in 1892 to 4.63% in 1912.

c. Austrian and Hungarian stocks
As is true for most capital-receiving economies, foreign investment into the private sector was weak in the case of Austria-Hungary. In 1892, it constituted only 13.78% of the overall debt held abroad; by 1913, this number had risen to 23.00%. Such a small proportion of private sector debt is not unusual under pre-World War I conditions, where asymmetric information often forced investors to buy safe government debt and railway bonds.[50]

The main difference between bonds and stocks is that stocks give rise to dividend payments rather than interest payments. While bonds pay a fixed interest rate, dividend payments can be highly volatile over the course of the years. As a result, relying on the nominal value of stocks abroad alone would not be sufficient to calculate interest payments. We have proceeded as follows: we have data both on the value of stocks held abroad and dividend payments effectuated abroad for the entire time span from 1892-1901.[51] Dividing the two, we were thus able to establish the dividend ratio for the years 1892-1901. The obtained values were compared to a calculation of the dividend ratio found in a book on Austrian joint stock companies from 1880 to 1913.[52] If a relationship between the two time series could be established, we could use it to calculate dividend payments in years for which we only know the amount of stocks held abroad. We found two things: (1) both dividend ratios show the same pattern of ups and downs, (2) the dividend ratio of companies with foreign investors was only slightly lower than those of the sample as a whole. Given our findings, we were able to calculate dividend payments abroad for the entire time period under investigation.

Remittances
Remittances from Austro-Hungarian emigrants to their native country constitute one of the most important items of the bop, alongside the balance of trade and capital flows/interest payments effectuated abroad. This reflects the ever-growing importance of emigration to the Americas in the late 19th century.

The calculation of remittances is beset with specific problems. As emigration from Europe and immigration into the Americas was largely unrestricted before World War I, there was little motivation

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[47] Cf. table 5, fn. 1 and 2.
[48] For a detailed discussion cf. appendix 1.
[49] For a detailed discussion cf. appendix 1.
[50] Cf. Stone, *The global export of capital from Great Britain. 1865-1914. A statistical survey* p. 28.
[51] For a detailed discussion cf. appendix 1.
[52] Mosser, *Industrieaktiengesellschaft in Österreich. Versuch einer historischen Bilanz- und Betriebsanalyse* (Vienna1980), p. 268.

for the administrations on both sides of the Atlantic to produce good statistics. Growing anti-immigration sentiment in the US, by far the most important destination of Austro-Hungarian emigrants, led to the famous Dillingham commission of 1911.[53] This commission produced the first comprehensive study of immigration into the US, containing a large number of statistics relevant in our context. In addition to the Dillingham report of 1911, we also benefit from a growing awareness in the dual monarchy regarding the importance of remittances to the bop. As emigration took off at the turn of the century, TzW-2 1904 contains useful information going back to the 1870s both on emigrants to the New World as well as their remittances to the dual monarchy via banks and postal services. When it became clear that the third edition of the "Tabellen zur Währungsstatistik" (TzW) would not be published as originally envisaged[54], the Austrian finance ministry decided to publish the data on remittances separately (Bartsch 1911).

The remittances were, essentially, calculated as the sum of three major components: first, the money transfers via banks and the postal services; second, the money brought home in person by temporary workers returning to their native Austria-Hungary; third, besides emigration to the New World there were many Austro-Hungarians working in Germany during the spring and summer and returning in autumn. This pattern of seasonal work abroad gave rise to a considerable inflow of money into Austro-Hungary, which has also been taken into account. Appendix 2 describes sources and calculations in detail.

Interest and dividend payments of foreign governments and companies in Austria-Hungary

Given the large debt held abroad, interest and dividend payments are a problem largely on the passive side of the bop. Interest payments abroad amounted to 319.3 million crowns and 374.6 million crowns in 1892 and 1913, respectively. At the same time, residents of Austria-Hungary also held stocks and bonds of foreign governments and companies that need to be taken into account. Our sources contain estimates for several benchmark years. They suggest that foreign assets in the hands of Austro-Hungarian residents rose from a very modest 400 millions crowns in 1893 to 950 million crowns in 1913. Comparing the foreign liabilities to the foreign assets (cf. table 5), we see that foreign liabilities exceeded foreign assets by roughly factor 200 in 1893 and by roughly factor 10 in 1913. Our sources also contain estimates for the interest and dividend payments on foreign assets held by residents in Austria-Hungary. For a detailed description of the sources, refer to appendix 2.

Transport and tourism

Transport and tourism are minor items of the bop, but they should be included for the sake of completeness. Both parts are positive throughout the entire period. For a detailed discussion, refer to appendix 2.

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[53] US Immigration Commission, *Reports of the Immigration Commission. Statistical Review of Immigration 1820 - 1910* (Washington (D.C.)1911).

[54] The third edition remained incomplete. In particular, data on the bop, contained in STW 1892 (section 15), TzW-1 (section 13), and TzW-2 (section 13), was not published.

Appendix 2: Balance of payments reconstruction: sources used in detail

Balance of trade
1880-1890:   STW 1892, table 192, p. 289
1891:   interpolation
1892-1902:   TzW-2 1904, p. 541, table 342 (cf. also p. 844)
                    („Handelsbilanzen des österreichisch-ungarischen Zollgebietes in den Jahren 1892 bis
                    1902. (Mit Ausschluss der edlen Metalle und Münzen.)")
1903-1913:   Bartsch 1917, p. 51, table 9
                    („Handelsbilanzen des österreichisch-ungarischen Zollgebietes in den Jahren 1903 bis
                    1913. (Mit Ausschluß der edlen Metalle und Münzen.)")

Additional information
For the period 1880-1890, the data found in STW only refer to "Spezialhandel", leaving aside
"Veredlungsverkehr". To fill the lacuna, it has been proceeded as follows: The data covering the period
1892-1913 separates between "Spezialhandel" and "Veredlungsverkehr". It emerges from the data that
"Spezialhandel" is the erratic part of the balance of trade, while "Veredlungsverkehr" always
constitutes a surplus for Austria-Hungary, averaging 40 million crowns until the turn of the century.
Therefore, 40 million crowns per year have been added to the data found in STW for "Spezialhandel".

Capital movements and interest payments effectuated abroad

Total government debt

Joint government debt
1880-1890: STW 1892, p. 341, table 228, 4th column
1883-1892: TzW-1 1893, p. 275, table 155, 4th column
1893-1902: TzW-2 1904, p. 618, table 393, 4th column
1899-1901: *Compass* 36 (1903), p. 16
1902-1904: *Compass* 39 (1906), p. 10
1905-1907: *Compass* 42 (1909), p. 10
1908-1910: *Compass* 45 (1912), p. 9-10
1911-1912: *Compass* 47 (1914), p. 11-12
1913: Bartsch 1917, p. 8

Austrian government debt
1880-1890: STW 1892, p. 341, table 228, 8th column
1883-1892: TzW-1 1893, p. 275, table 155, 8th column
1893-1902: TzW-2 1904, p. 619, table 393, 8th column
1899-1901: *Compass* 36 (1903), p. 16
1902-1904: *Compass* 39 (1906), p. 10
1905-1907: *Compass* 42 (1909), p. 10
1908-1910: *Compass* 45 (1912), p. 9-10
1911-1912: *Compass* 47 (1914), p. 11-12
1913: Bartsch 1917, p. 8

Hungarian government debt

1868-1892: TzW-1 1893, p. 290, table 173, 2nd column
1896-1900: *Compass* 36 (1903), pp. 16-17
1901-1903: *Compass* 39 (1906), pp. 10-11
1904-1906: *Compass* 42 (1909), pp. 10-11
1907-1908: *Compass* 45 (1912), p. 10
1909:   *Compass* 46 (1913), p. 10-11
1910:   *Compass* 47 (1914), p. 12
interpolations: 1893-1895, 1911-1913

<u>3 time series representing the joint government debt (numbers according to table 1)</u>

#1	<u>4.2% Notenrente</u>
NV	1878: *Compass* 13 (1880), p. 461
	1881: *Compass* 16 (1883), p. 779
	1886, 1902, 1912: *Compass* 47 (1914), p. 16
	1887: *Compass* 22 (1889), p. 41
	1891: TzW-1 1893, pp. 276-277, table 157
	1892-1900: TzW-2 1904, pp. 214-249, tables 224-232
	1902-1903: *Compass* 38 (1905)
	1904-1912: no change
	1913: Bartsch 1917, p. 117
	interpolations : 1879-80, 1882-85, 1888-90, 1901
OP	coupon renewal data
	1879-1889: STW 1892, p. 330, table 219 → median 1884
	1892-1901: TzW-2 1904, p. 270, table 250 → median 1896, 1897
	1901-1903: TzW-2 1904, p. 707, table 445 → median 1902
	1913: Bartsch 1917, p. 117
	interpolations: 1878-1883, 1885-1895, 1898-1901, 1903-12
MV	1878-1883: STW 1892, p. 305, table 202
	1884-1913: Bunzl 1914, appendix 2 (4.2% gemeinsame Notenrente Feb.-Aug.)

#2	<u>4.2% Silberrente</u>
NV	1878: *Compass* 13 (1880), p. 461
	1881: *Compass* 16 (1883), p. 779
	1886, 1902, 1912: *Compass* 47 (1914), p. 16
	1887: *Compass* 22 (1889), p. 41
	1891: TzW-1 189, pp. 276-277, table 157
	1892-1900: TzW-2 1904, pp. 214-249, tables 224-232
	1903: *Compass* 38 (1905), p. 16
	1913: Bartsch 1917, p. 117
	interpolations: 1879-80, 1882-85, 1888-90, 1901, 1904-1911
OP	coupon renewal data
	1879-1889: STW 1892, p. 330, table 220 → median: 1884
	1892-1901: TzW-2 1904, p. 271, table 251 → median: 1896, 1897
	1901-1903: TzW-2 1904, p. 708, table 446 → median: 1902
	1913: Bartsch 1917, p. 117
	interpolations: 1879-1883, 1885-1895, 1898-1901, 1903-12

coupon payment data (alternative option)
1892-1901: TzW-2 1904, p. 254, table 234
(similar data may be found in: 1892: TzW-1 1893, pp. 278-279, table 158; 1893-1901: TzW-2 1904, pp. 214-249, tables 224-232)
1912-1913: Bartsch 1917, p. 117
interpolations: 1902-11

MV   1878-1883: STW 1892, p. 306, table 203
1884-1913: Bunzl 1914, appendix 2 (4.2% gemeinsame Silberrente April-Okt.)

#3   <u>4% konvertierte einheitliche Rente</u>
NV   1903: *Compass* 38 (1905), p. 17
1904-1911: no change
1912: *Compass* 47 (1914), p. 17
1913: Bartsch 1917, p. 118
OP   coupon renewal data
1903, 1913: Bartsch 1917, p. 118
interpolations: 1904-1912
coupon payment data (not included in the sensitivity analysis)
1912, 1913: Bartsch 1917, p. 118
MV   1903-1913: Bunzl 1914, appendix 2 (4% konvertierte Mairente)

<u>17 time series representing the Austrian government debt (numbers according to table 1)</u>

#4   <u>4% österreichische Goldrente</u>
NV   1876-1891: *Compass* 47 (1914), pp. 19-20
1892-1900: TzW-2 1904, pp. 214-249, tables 224-232
1901-1912: *Compass* 47 (1914), pp. 19-20
1913: Bartsch 1917, p. 118
(NB: the nominal value is reported in Austro-Hungarian gold florins)
OP   coupon renewal data
1889-1890: STW 1892, p. 329, table 218
1900-1902: TzW-2 1904, p. 272, table 252 → median: 1901
1909: Bartsch 1917, p. 118
interpolations: 1878-1888, 1891-1900, 1902-1908, 1910-1913
coupon payment data (alternative option)
1880-1891: STW 1892, p. 328, table 217
1892-1901: TzW-2 1904, pp. 252-253, table 233
1903-1912: Bartsch 1917, p. 14
interpolations: 1879 (average of the years 1880-1882), 1902, 1913
MV   1876-1891: STW 1892, p. 306, table 204
1892-1913: Bunzl 1914, appendix 2
(NB: the bond price is reported in crowns to be paid for a bond of a nominal value of 50 Austro-Hungarian gold florins)

#5   <u>5% österreichische Notenrente (-1892) and 4% österreichische Kronenrente (1893-)</u>
NV   1881-1887: *Compass* 22 (1889), p. 43
1888: *Compass* 23 (1890), p. 40
1891: TzW-1 1893, pp. 276-277, table 157

1892, 1894-1912: *Compass* 47 (1914), pp. 20-21
1893: TzW-1 1893, p. 299, table 182
1913: Bartsch 1917, p. 119
interpolations: 1889-1890

OP   coupon payment data
1892: TzW-1 1893, pp. 278-279, table 158
1893-1901: TzW-2 1904, pp. 214-249, tables 224-232
1911-1912 : Bartsch 1917, p. 119
interpolations: 1902-1910, 1913
coupon renewal data (not included in the sensitivity analysis)
1913: Bartsch 1917, p. 119
interpolations: 1880-1912

MV   1881-1883: STW 1892, p. 306, table 205
1884-1913: Bunzl 1914, appendix 2

#6   <u>3.5% österreichische Investitionsrente</u>
NV   1897-1912: *Compass* 47 (1914), p. 22
1913: Bartsch 1917, p. 119
OP   data relating to the issue of the bond
1897: Bartsch 1917, p. 119
1913: Bartsch 1917, p. 119
interpolations: 1898-1912
coupon payment data (not included in the sensitivity analysis)
1897-1901: TzW-2 1904, pp. 230-249, tables 282-232
 (apparently, coupon payments were later on no longer made abroad,
cf. *Compass* 47 (1914), p. 22)
MV   1897: *Compass* 47 (1914), p. 22
1898-1913: Bunzl 1914, appendix 2

#7   <u>4.5% österreichische Staatsanleihe für Eisenbahnzwecke</u>
NV   1913: Bartsch 1917, p. 120 and *Compass* 47 (1914), p. 22
OP   coupon payment data
1913: Bartsch 1917, p. 120
MV   1913: *Compass* 47 (1914), p. 22

#8   <u>4% PO Böhmische Nordbahn</u>
NV   1882, 1912: *Compass* 47 (1914), p. 29
1913: Bartsch 1917, p. 120
interpolations: 1883-1911
(NB: the nominal value is reported in German Mark)
OP   coupon payment data
1913: Bartsch 1917, p. 120
A constant overseas proportion of 94% has been assumed on the following grounds: (1)
in 1882, the bond was issued exclusively in Germany, (2) the bond was traded at the
Vienna stock exchange only in 1909
MV   1882: *Compass* 47 (1914), p. 29 (bond price of first issue)
1883-1912: *Compass* 47 (1914), p. 29 (bond price at the end of the year)

(NB: the bond price is reported in German Mark to be paid for a bond of a nominal value of 1 German Mark)

#9	4% PO Franz-Josef-Bahn (Silber)
NV	1884, 1912: *Compass* 47 (1914), p. 34
	1891: TzW-1 1893, pp. 276-277, table 157
	1892-1900: TzW-2 1904, pp. 214-249, tables 224-232
	1913: Bartsch 1917, p. 122
	interpolations: 1885-1890, 1901-1911
OP	coupon payment data
	1892: TzW-1 1893, pp. 278-279, table 158
	1893-1900: TzW-2 1904, pp. 214-249, tables 224-232
	1901: *Compass* 1914, p. 34
	1912, 1913: Bartsch 1917, p. 122
	interpolations: 1879-1891 (average of the years 1892-1894), 1902-1911
	coupon renewal data (not included in the sensitivity analysis)
	1904, 1913: Bartsch 1917, p. 122
MV	1887-1912: *Compass* 47 (1914), p. 34 (bond price at the end of the year)

#10	4% PO Elisabethbahn (Mark)
NV	1883, 1912: *Compass* 1914, p. 31
	1892-1901: TzW-2 1904, pp. 214-249, tables 224-232
	1913: Bartsch 1917, p. 123
	interpolations: 1884-1891, 1902-1911
	(NB: the nominal value is reported in German Mark)
OP	coupon payment data
	1888-1892: TzW-1 1893, p. 281, table 161
	1892-1901: TzW-2 1904, p. 256, table 236
	1902-1912: Bartsch 1917, p. 123
	interpolation: 1913
	coupon renewal data (alternative option)
	1902-1903: *Compass* 47 (1914), p. 31
	1913: Bartsch 1917, p. 123
	interpolations: 1883-1901, 1904-1912
MV	1888-1912: *Compass* 47 (1914), p. 31 (bond price at the end of the year)
	(NB: the bond price is reported in crowns to be paid for a bond of a nominal value of 1 German Mark)

#11	4% SSV Elisabethbahn (Gold)
NV	1891: TzW-1 1893, pp. 276-277, table 157
	1892-1900: TzW-2 1904, pp. 214-249, tables 224-232
	1912: *Compass* 47 (1914), p. 25
	1913: Bartsch 1917, p. 123
	interpolations: 1879-1890, 1901-1911
	(NB: the nominal value is reported in Austro-Hungarian gold florins)
OP	coupon payment data
	1891: TzW-1 1893, p. 281, table 160

1892-1901: TzW-1 1900, p. 255, table 235
1901: *Compass* 47 (1914), p. 25
1902-1913: Bartsch 1917, p. 123
interpolations: 1879-1890
coupon renewal data (not included in the sensitivity analysis)
1910: Bartsch 1917, p. 123 (NB: only coupon renewal in Germany)

MV   1888-1912: *Compass* 47 (1914), p. 25 (bond price at the end of the year)
(NB: the bond price is reported in crowns to be paid for a bond of a nominal value of 50 Austro-Hungarian gold florins)

#12   <u>4% PO Karl-Ludwig-Bahn (Silber)</u>
NV   1890, 1912: *Compass* 47 (1914), p. 34
1892-1900: TzW-2 1904, pp. 214-249, tables 224-232
1913: Bartsch 1917, p. 123
interpolations: 1891, 1901-1911

OP   coupon payment data
1892: TzW-1 1893, pp. 278-279, table 158
1893-1901: TzW-2 1904, p. 261, table 241
1902-1912: Bartsch 1917, p. 123 (average)
interpolations: 1913
coupon renewal data (not included in the sensitivity analysis)
1905, 1913: Bartsch 1917, 123 (lower bound, as only coupon renewal in Germany is included)
interpolations: 1890-1904, 1906-1912

MV   1893-1912: *Compass* 47 (1914), p. 34 (bond price at the end of the year)

#13   <u>4% SSV Karl-Ludwig-Bahn (Kronen)</u>
NV   1891: TzW-1 1893, pp. 276-277, table 157
1902, 1912: *Compass* 47 (1914), p. 26
1913: Bartsch 1917, p. 124
interpolations: 1879-1890, 1892-1901, 1903-1911

OP   coupon renewal data
1892: TzW-1 1893, pp. 278-279, table 158
1902, 1913: Bartsch 47 (1917), p. 124
interpolations: 1893-1901, 1903-1912

MV   1902-1912: *Compass* 47 (1914), p. 26 (bond price at the end of the year)

#14   <u>4% PO Rudolfbahn (Silber)</u>
NV   1884, 1912: *Compass* 47 (1914), p. 41
1891: TzW-1 1893, pp. 276-277, table 157
1892-1900: TzW-2 1904, pp. 214-249, tables 224-232
1913: Bartsch 1917, p. 124
interpolations: 1885-1890, 1901-1911

OP   coupon payment data
1889-92: TzW-1 1893, p. 282, table 163
1892-1901: TzW-2 1904, p. 267, table 247
1912-1913: Bartsch 1917, p. 124
interpolations: 1902-1911

coupon renewal data (not included in the sensitivity analysis)
1903-1904: Bartsch 1917, 124 (lower bound, as only coupon renewal in Germany is included)
interpolations: 1884-1902, 1905-1913

MV   1889-1912: *Compass* 47 (1914), p. 41 (bond price at the end of the year)

#15   <u>4% PO Rudolfbahn (Mark)</u>
NV   1884, 1912: *Compass* 47 (1914), p. 40
1891: TzW-1 1893, pp. 276-277, table 157
1892-1900: TzW-2 1904, pp. 214-249, tables 224-232
1913: Bartsch 1917, p. 124
interpolations: 1885-1890, 1901-1911

OP   coupon payment data
1889-92: TzW-1 1893, p. 281, table 162
1893-01: TzW-2 1904, pp. 214-249, tables 224-232
1902-12: Bartsch 1917, p. 124
interpolation: 1913
coupon renewal data (alternative option)
1903-04: Bartsch 1917, p. 124 (lower bound, as only coupon renewal in Germany is included)
1913: Bartsch 1917, p. 124
interpolations: 1884-1902, 1905-1912

MV   1890-1912: *Compass* 47 (1914), p. 40 (bond price at the end of the year)
(NB: the bond price is reported in crowns to be paid for a bond of a nominal value of 50 Austro-Hungarian gold florins)

#16   <u>4% SSV Rudolfbahn (Kronen)</u>
NV   1891: TzW-1 1893, pp. 276-277, table 157
1892-1900: TzW-2 1904, tables 224-232
1912: *Compass* 47 (1914), p. 27
1913: Bartsch 1917, p. 124
interpolations: 1879-1890, 1901-1911

OP   coupon renewal data
1893, 1913: Bartsch 1917, p. 124
interpolations: 1879-1892, 1894-1912
coupon payment data (alternative option)
1893-1901: TzW-2 1904, pp. 214-249, tables 224-232

MV   1893-1903: *Compass* 38 (1905), p. 24 (= *Compass* 47 (1914), p. 27)

#17   <u>3% PO Ö-U Staatseisenbahngesellschaft</u>
NV   1912: *Compass* 47 (1914), p. 41
1913: Bartsch 1917, p. 127
interpolations: 1879-1911

OP   coupon renewal data
1879-1913: Bartsch 1917, p. 127 (average)
coupon payment data (alternative option)
1900-1901: *Compass* 47 (1914), p. 42

1912-1913: Bartsch 1917, p. 127

#18	<u>3% PO Ö-U Staatseisenbahngesellschaft, Ergänzungsnetz</u>
NV	1912: *Compass* 47 (1914), p. 42
	1913: Bartsch 1917, p. 127
	interpolations: 1879-1911
OP	coupon renewal data
	1879-1913: Bartsch 1917, p. 127 (average)
	coupon payment data (alternative option)
	1901: *Compass* 47 (1914), p. 42
	1913: Bartsch 1917, p. 127

#19	<u>4% PO Ö-U Staatseisenbahngesellschaft (Franken, 1900)</u>
NV	1900, 1907, 1908, 1912: *Compass* 47 (1914), p. 43
	1913: Bartsch 1917, p. 127
	interpolations: 1901-1906, 1909-1911
OP	coupon renewal data
	1880-1913: Bartsch 1917, p. 127 (average)
	coupon payment data (not included in the sensitivity analysis)
	1913: Bartsch 1917, p. 127

#20	<u>4% PO Staatseisenbahngesellschaft (Mark, 1883)</u>
NV	1883, 1912: *Compass* 47 (1914), p. 42
	1913: Bartsch 1917, p. 128
	interpolations: 1884-1911
OP	coupon renewal data
	1883-1913: Bartsch 1917, p. 128 (average)
	coupon payment data (not included in the sensitivity analysis)
	1901: *Compass* 47 (1914), p. 42
	1913: Bartsch 1917, p. 128

Additional information on MV

Good data are available for bond prices. The most important source is Bunzl's 1914 publication on the Vienna bond market, which contains bond prices for the most important bonds for 1884-1913. To cover the years 1880 to 1883, we referred to STW 1892. In addition, use has been made of the *Compass*.

In a limited number of cases, relevant data could not be found in any of the publications. This is true especially for the early 1880s; it is also true for several railway bonds, which benefit from better data availability only when they became fully-fledged government debt due to nationalisation at the turn of century. In these cases, data of the most comparable bond has been taken. Such a completion of data with the help of standard bonds (especially the "4% österreichische Goldrente" and the "4% österreichische Kronenrente"; numbers (4) and (5) respectively) was the most promising approach, as a comparison of different bond prices has shown that bond prices are largely determined by two factors, i.e. the nominal interest rate (in most cases 4% of the nominal value) and the currency of issue (either gold or paper/silver).

4 time series representing the Hungarian government debt

4% Hungarian gold bond
NV   1881- 1913:   Compass 47 (1914), pp. 75-76 (Goldgulden)
NV   1892-1900:   TzW-2 1904, pp. 467-483, tables 295a – 303a (crown)
OP-CP 1892:   TzW-1 1893, p. 294, table 177
        1893-1901:   TzW-2 1904, pp. 467-483, tables 295a – 303a
        1903-1905:   Fellner 1908, appendix 6
OP-CR 1891-1892:   Tzw-2 1904, pp. 494-495, table 324
        1898-1899:   Tzw-2 1904, pp. 494-495, table 324
        1901-1903:   Tzw-2 1904, pp. 494-495, table 324

5% Hungarian paper bond (5% Papierrente)
NV   1881-1886:   Compass 21 (1888), pp. 46-47
        1887:   Compass 23 (1890), p. XLIV
        1888-1891:   interpolation
        1892:   TzW-2 1904, pp. 467-469, tables 295a – 296a
OP-CP 1892:   TzW-1 1893, p. 294, table 177
        1893:   TzW-2 1904, p. 467, table 295a

4% Hungarian paper bond (4% Ungarische Kronenrente)
NV   1894-1901:   TzW-2 1904, pp. 471-483, tables 296a – 303a
        1902-1913:   Compass 47 (1914), pp. 77-79
OP-CR 1894-1901:   TzW-2 1904, pp. 469-483, tables 296a – 303a
        1903-1905:   Fellner 1908, appendix 6
        1906-1913:   Gradual decline based on extrapolation of data 1904 and 1905

1 time series representing private railway bonds
We have estimates regarding private railway debt held abroad for the years 1892, 1901, and 1912. For 1901 (TzW-2 1904, p. 423, table 277, ##262, 263) and 1912 (Bartsch 1917, p. 19, table 1), the Austrian ministry of finance estimates private foreign railway debt to be 3074.4 million crowns and 1932.8 million crowns, respectively. The figure for 1901 needs to be corrected downwards to avoid double-counting for the years before nationalisation occurred in the case of some railways; as bonds ##8, 17-20 represent railways that were nationalised only in 1908/1910, we have two different types of series before the nationalisation took place: first, the time series ##8, 17-20; second, the very same railways are also included in the estimates of private railway debt mentioned above. Therefore, we have deducted the amount of private railway debt represented by the time series ##8, 17-20 from the 1901 estimates of private railway debt held abroad: 3074.4 million crowns – 811.6 million crowns = 2262.8 million crowns (the value of 811.6 is based on own calculations).

For 1892, we do not have an estimate regarding the nominal value of private railway debt held abroad. We do know that interest payments of private railways effectuated abroad in 1892 amounted to 100.3 million crowns, compared to 105.1 million crowns in 1901 (TzW-2 1904, pp. 342-343, table 262). Given that the private foreign railway debt in 1901 was calculated to be 2262.8 million crowns, the foreign railway debt in 1892 was estimated as (100.3 / 105.1) * 2262.8 million crowns = 2159.5 million crowns (none of the railways represented by bonds ##8-20 was nationalised between 1892 and 1901, obviating any need to control for double counting, cf. above).

Thus, our calculations suggest that railway debt abroad from 1892 – 1913 averaged approximately 3,000 million crowns; in the beginning, the vast majority (2957.0 million crowns) was private debt (the only exceptions being bonds ##9-16, which encompass 293.7 million crowns held abroad); at the end, about one third of the debt had been nationalised (1163.2 million crowns vs. 1932.8 million crowns; for all numbers cf. table 2). This finding for the years 1892 – 1913 has encouraged us to argue with an approximate foreign railway debt of 3000 million crowns before 1892; technically speaking, we extrapolated the data backwards beyond 1892. This seemed justified on the following grounds: (1) the construction of railways in Austria-Hungary was largely finished by 1880, implying that the nominal value of issued bonds was relatively stable throughout the 1880s; (2) this finding shifts the question as to whether there is any reason to believe that foreign ownership of bonds could have undergone dramatic change in the 1880s. From the railway bonds included in our sample of government bonds we know that the overseas proportion was subject to extremely little fluctuation from 1892 to 1913 (cf. table 1, bonds ##8-20). Also, Bunzl 1914 provides, among others, a detailed account of shifts in bond holding patterns, but he nowhere mentions anything that would make us believe that the stable pattern of railway debt abroad was any different before 1892 from thereafter.

OP, MV, i
As the data only takes foreign held private railway debt into account, there is no need to establish the overseas proportion in percent. As for the bond price and the nominal interest rate, a comparison with the railway bonds we have good data on (cf. table 1, bonds ##8-20) suggests that most railway bonds were gold-denominated bonds with a nominal interest rate of 4%. Hence, i was set to be 4% and MV was approximated by the bond price of the 4% Austrian gold bond.

1 time series representing public bonds at the regional and local level
We have estimates regarding public bonds at the regional and local level for the years 1892, 1901, and 1912. For 1901 (TzW-2 1904, p. 423, table 277, ##259-261, 267) and 1912 (Bartsch 1917, p. 19, table 1: "Öffentliche Anlehen", "Pfandbriefe …", "Diverse Lose"), the Austrian ministry of finance estimates public bonds at the regional and local level to be 165.2 and 409.4 million crowns, respectively. For 1892, we do not have an estimate regarding the nominal value of public bonds at the regional and local level. We know that interest payments on these bonds in 1892 amounted to 8 million crowns , compared to 9.5 million crowns in 1901 (TzW-2 1904, pp. 298-299 and pp. 324-325, tables 259 and 261). Therefore, the nominal value of public bonds in 1892 was estimated as (8.0 / 9.5) * 165.2 million crowns = 138.9 million crowns. Data for 1880-1891 was obtained by backwards extrapolation beyond 1892.

OP, MV, i
As the data only takes foreign held public bonds into account, there is no need to establish the overseas proportion in percent. As for the bond price and the nominal interest rate, tables 259 and 261 (TzW-2 1904, pp. 292-299 and pp. 310-325) suggest that most public bonds at the regional and local level were relatively similar to the 4% Austrian gold bond. Hence, i was set to be 4% and MV was approximated by the bond price of the 4% Austrian gold bond.

4 time series representing Austrian and Hungarian stocks
Starting point was the Hungarian stocks, where we have data both on the value of stocks abroad and the dividend payments effectuated abroad for the entire time span from 1892 to 1901 (TzW-2 1904, pp. 500-501, table 327, columns 6 and 11). Dividing the dividend payments by the value of stocks allowed us to establish the dividend ratio for 10 subsequent years. The obtained values were compared to a

calculation of the dividend ratio found in a book on joint stock companies in Austria-Hungary from 1880 to 1913[55]; if a relationship between the two time series could be established, we could use it to calculate dividend payments in years for which we only know the amount of stocks held abroad. We found two things: (1) both dividend ratios show the same pattern of ups and downs, (2) the dividend ratio of companies with foreign investors was only slightly lower than those of the sample as a whole.

What remained to be established were hence estimates for the value of Hungarian stocks held abroad. Bartsch 1917, p. 20, table 2 delivers such an estimate of Hungarian stocks abroad of 551.2 million crowns ("Aktien von Verkehrsunternehmungen" and "Aktien von Kreditinstituten…"). Values between 1902 and 1911 were interpolated. According to the afore-mentioned estimates of TzW-2 1904, there were 104.7 million crowns of Hungarian stocks held abroad in 1892. In absence of any indication to the contrary, the same value was used for the years 1880 – 1891.

TzW-2 1904 (pp. 500-501, table 327, columns 8 and 12) and Bartsch 1917 (p. 20, table 2: "Pfandbriefe und Obligationen…" and "Obligationen von Verkehrsanstalten") contain similar estimates for private bonds for the years 1892 – 1901 and 1912, respectively. The data suggest that the private bonds under consideration were quite similar to stocks; in particular, they gave rise to dividend payments rather than a fixed interest rate (as evidenced by strong correlation with the dividend ratio from Mosser 1980, p. 268, cf. above). Therefore, we treated the Hungarian private bonds similar to the Hungarian stocks. The same applies to the necessary interpolations.

In the case of Austria, TzW-2 1904 (pp. 423-424, table 277, ##264-266 (private bonds) and ##268-275 (stocks)) and Bartsch 1917 (p. 19, table 1: "Obligationen von sonstigen Transportunternehmungen" and "Obligationen industrieller Gesellschaften" (private bonds) and four different categories of "Aktien…" (stocks)) provide data regarding stocks and private bonds held abroad for 1901 and 1912, respectively. For 1901, TzW-2 1904 reports the dividend payments abroad in the same table. As in the case of Hungary, the dividend payments abroad corresponded nicely to what we would expect from the dividend ratio calculated by Mosser 1980 (p. 268, cf. above).

What remained to be established were hence estimates for the value of Austrian bonds and private debt held abroad. For 1892, TzW-2 1904 reports the dividend payments effectuated abroad (private bonds: pp. 354-355, table 264 and pp. 356-357, table 265; stocks: pp. 374-375, table 268, pp. 390-391, table 270, pp. 396-397, table 272, pp. 400-401, table 274). With the help of the dividend ratio of Mosser 1980 (p. 268) we could thus estimate the value of Austrian bonds and private debt held abroad in 1892, leading to three benchmark estimates for the years 1892, 1901, and 1912. The remaining data was interpolated.

Remittances

As indicated in appendix 1, remittances were calculated as the sum of three major components: (1) the money transfers via banks and postal services; (2) the money brought home in person by temporary workers in the Americas returning to their native Austria-Hungary; (3) the money brought home by Austro-Hungarian workers who work seasonally abroad in other European countries, mainly in Germany.

1. Money transfers via banks and postal services

Emigration from Austria-Hungary to the New World (or, more broadly speaking, areas of recent settlement including countries such as South Africa, Australia, and New Zealand) essentially meant emigration to the United States. For the years 1892-1913, we possess data both on emigrants from Austria-Hungary overseas and on Austro-Hungarian immigrants into the United States (emigrants:

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[55] Mosser 1980, p. 268.

1892-1902: TzW-2 1904, p. 818, table I; 1903-1913: Bartsch 1917, p. 66, table 14; Austro-Hungarian immigrants into the US: 1875-1902: TzW-2 1904, p. 580, table 371; 1903-1913: Bartsch 1917, p. 66, table 14). They show that 9 out of 10 Austro-Hungarian emigrants actually went to the US (3,604,330 emigrants vs. 3,224,691 Austro-Hungarian immigrants into the US). In terms of monetary flows resulting from emigration, we have reason to believe that the relationship between the US and the dual monarchy actually reflects much more than the 90% indicated; for emigrants who went to Latin America, Africa and Australasia were said to settle their for good, while emigrants to the US had the intention to return (Bartsch 1917, p. 67). Emigrants who leave their family behind for good, however, are less likely to send remittances than those with the explicit intention to return. Following the suggestion of Bartsch 1917, we felt therefore justified in concentrating only on the US when establishing the remittances.

According to our sources (Bartsch 1917, pp. 67-70), emigrants could send money to Austria-Hungary through two main channels: via postal services and, much more important quantitatively, through banks. We possess good data on both channels, but some problems had to be overcome nonetheless.

In the case of the postal services, we have a complete time series on remittances to Austria from 1892 to 1913 (1892-1902: TzW-2 1904, p. 822; 1903-1913: Bartsch 1917, p. 68). As the value for 1892 is 1.4 million crowns only, we could reasonably neglect values for 1880 – 1891 for which we do not have data. The absence of data for Hungary posed a bigger problem. It has been proceeded as follows: We do know the separate numbers of Austrian emigrants as opposed to Hungarian emigrants (Austrian emigrants: 1892-1902: TzW-2 1904, p. 818, table I; 1903-1913: Bartsch 1917, p. 66; Hungarian emigrants: 1892-1900: TzW-2 1904, p. 818, table I; 1901-1902: Fellner 1908, p. 86; 1903-1913: Bartsch 1917, p. 66). Knowledge of the Austrian emigrants to the US combined with our knowledge on their remittances via postal services allowed us to establish a pattern between the two time series; the statistically most satisfactory solution was also historically convincing: regressing the Austrian postal services on (1) the number of Austrian immigrants in the same year and (2) the number of Austrian immigrants over the past five years. The historical rationale behind the regressors included is the very high propensity of same-year immigrants to send money home, and the slightly lower propensity of recent immigrants to send money home. After 5 years of permanent residence, immigrants had normally made up their mind: they would return to their native country, or, alternatively, they would integrate into US society fully; in both cases, remittances would end. In a second step, the econometric relationship established for Austria was used for the case of Hungary where we only possess data on the number of emigrants. This procedure allowed us to obtain an estimate for Hungarian remittances via postal services.

In the case of remittances via banks, the data problem was slightly different. For the years 1893 to 1913 we have very good data on remittances via banks both to Austria and to Hungary (there were two kind of banks for which we have separate data: (1) "Postsparkassen" and (2) "Banken"; as for (1), data were found in: 1893-1902: TzW-2 1904, p. 582; 1903-1913: Bartsch 1917, p. 70; as for (2) data were found in: 1893-1902: TzW-2 1904, p. 582, table 372 (Austria) and table 373 (Hungary); 1903-1913: Bartsch 1917, p. 70). The problem here was to extrapolate backwards behind 1892. As remittances via banks were substantially higher than remittances via postal services, we cannot simply omit the data for 1880-1891. Essentially, we have proceeded very similarly to the afore-mentioned case of the postal services: For the time span 1892 – 1913 we have two kinds of data: the number of emigrants to the US (cf. above) and their bank transfers to Austria-Hungary. This allowed us to establish a pattern between the two time series. As in the case of the postal services, regressing the bank transfers on (1) the number of Austro-Hungarian immigrants in the same year and (2) the number of Austrian-Hungarian immigrants over the past five years yielded the statistically most satisfactory solution and was

considered historically convincing (cf. above). As we do have data on Austro-Hungarian immigrants into the US starting from 1875 (TzW-2 1904, p. 580, table 371), we were thus able to extrapolate the data on remittances via banks backwards beyond 1892.

2. Money brought home in person by temporary workers returning from overseas
Money was not only sent home via postal services and banks, but it was also brought home in person by temporary workers returning from overseas to their native country. As indicated above, in many cases people going to the US did not intend to stay there for good; rather, they intended to work in the US for a limited period of time in order to save as much money as possible. Both the Dillingham commission of 1911 and the Austrian ministry of Finance were well aware of such patterns and, hence, provide good data. Essentially, we need to know (1) the number of temporary workers returning to their native country and (2) the average amount of money they would bring home. Dillingham 1911 (pp. 41-52) and the Austrian ministry of Finance (Bartsch 1917, p. 70) provide data on (1). The average amount of money they brought home is naturally somewhat difficult to determine, but several sources available seem to indicate that a one-year's salary (!) was approximately what people were returning with (Bartsch 1911, p. 138; Bartsch 1917, p. 70). At the end of period under consideration, that would amount to approximately 2000 crowns per returning temporary workers.

3. Money brought home by seasonal workers in Europe
Wage differentials between some of the poorer parts of Austria-Hungary, eg Galicia, the Bukowina, and Hungary, and neighbouring Germany were such that a large number of Austria-Hungarians worked abroad seasonally, leaving their country in spring and returning in autumn (Bartsch 1917, pp. 72-75). While the figures for the resulting money inflows never reached the levels of (1) and (2), they still amount to a considerable sum of 35 million crowns in 1913. As Bartsch 1917, p. 75 provides reliable estimates, we have included them in our calculations.

Interest and dividend payments of foreign governments and companies in Austria-Hungary

The calculations of Interest and dividend payments of foreign governments and companies in Austria-Hungary are less complicated than the reverse case, i.e. the calculation of interest payments effectuated abroad. While the same methodology could easily be applied, data availability forces us to simplify the procedure. If we wanted to apply the same methodology, we would need to know what kinds of foreign bonds residents in Austria-Hungary were holding; for obvious reasons, this is much more difficult than the reverse case where we can rely on Austro-Hungarian sources only.

Therefore, we have to content ourselves with estimates regarding the volume of foreign assets and the interest payments. TzW-2 1904 (p. 771) and Bartsch 1917 (p. 34) contain such estimates for the years 1901 and 1910-1913, respectively. TzW-1 1893 (p. 309, table 184 and p. 312) only contains an estimate regarding the volume of foreign assets, but the amount of interest payments can be estimated based on the assumption that the nominal interest rate remained roughly similar. The values for years without a benchmark estimate were obtained by interpolation.

Transport and tourism

Our sources contain estimates for the transport sector for 1892-1901 (TzW-2, p. 845) and 1907-1912 (Bartsch 1917, p. 65). Values for the remaining years were obtained by interpolation. As for tourism, data were found for 1892 – 1901 (TzW-2, p. 845) and for 1903 – 1913 (Bartsch 1917, p. 86). Values for the remaining years were obtained by interpolation.

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1878: 3756 / FM, 4295 / FM, 4305 / FM, 4502 / FM, 4532 / FM, 4644 / FM
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1880: 6240 / FM
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1882: 886 / FM

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Figure 1: **Overseas proportion of the 4.2% paper bond and the 4.2% silver bond.**
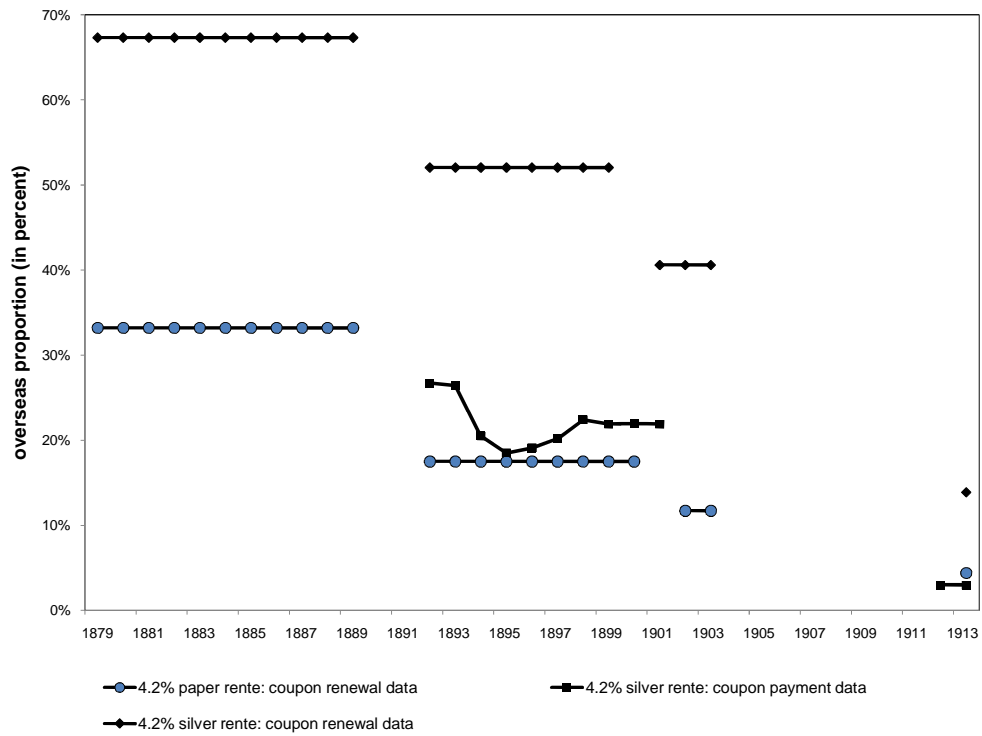
Source: Cf. appendix 2.

Figure 2:   Overseas proportion of the 4% Austrian gold bond.
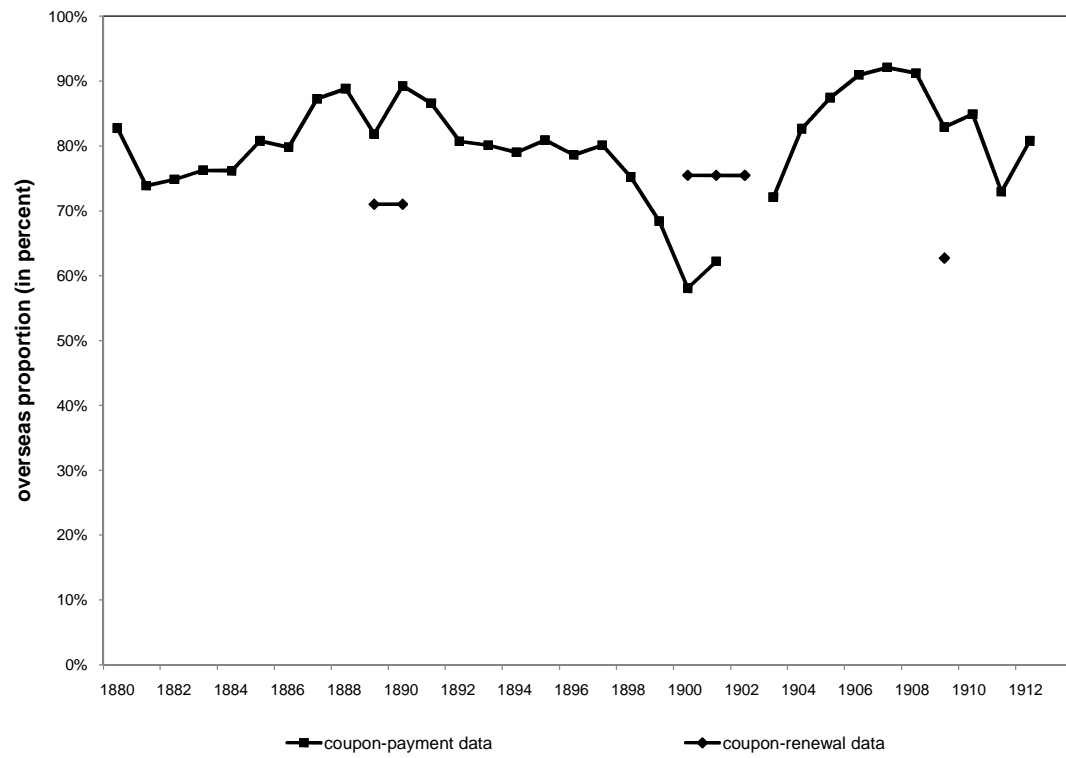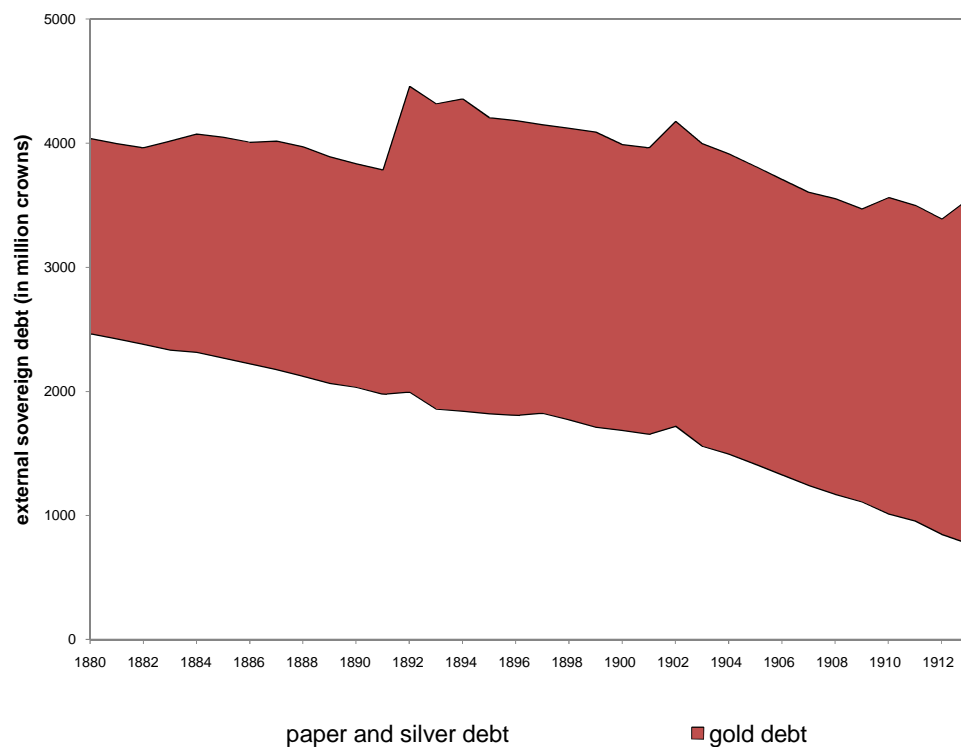
Source: Cf. appendix 2.

Figure 3: **Bond spreads of paper and silver bonds over gold bonds (in basis points).**

Source: k.k. Finanzministerium, *Statistische Tabellen zur Währungs-Frage der Österreichisch-ungarischen Monarchie*, Vienna 1892, p. 324, figure 216.

Figure 4:   Composition of external sovereign debt, 1880-1913.

Source: Own calculations based on sources as described in the appendix.
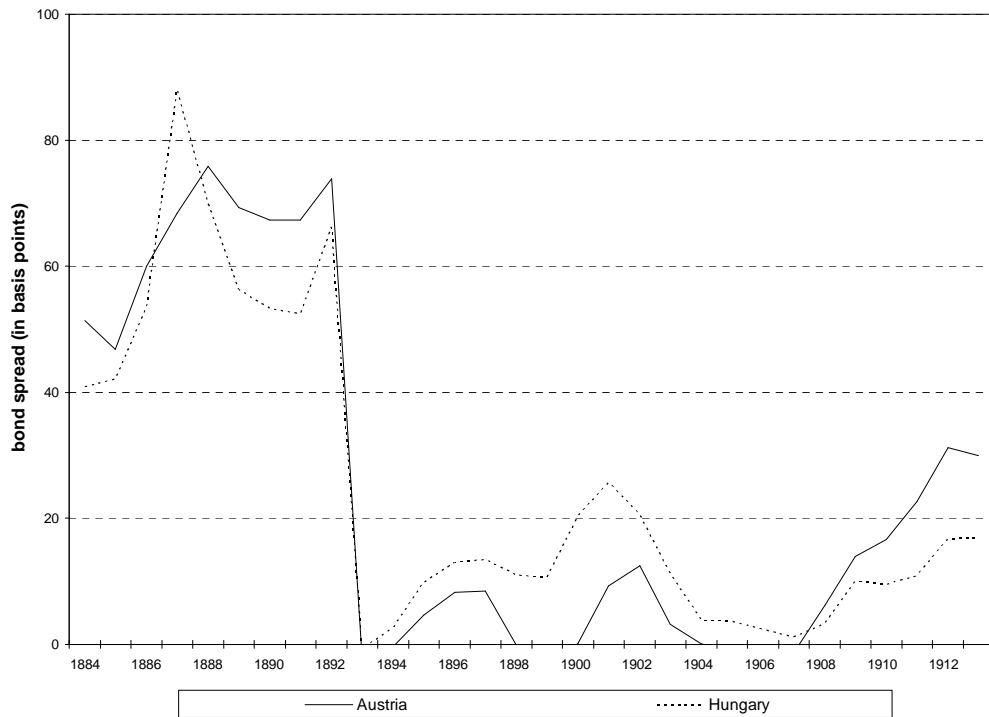
Figure 5: **Bond spreads of Austrian and Hungarian paper bonds over gold bonds, 1884 – 1913.**

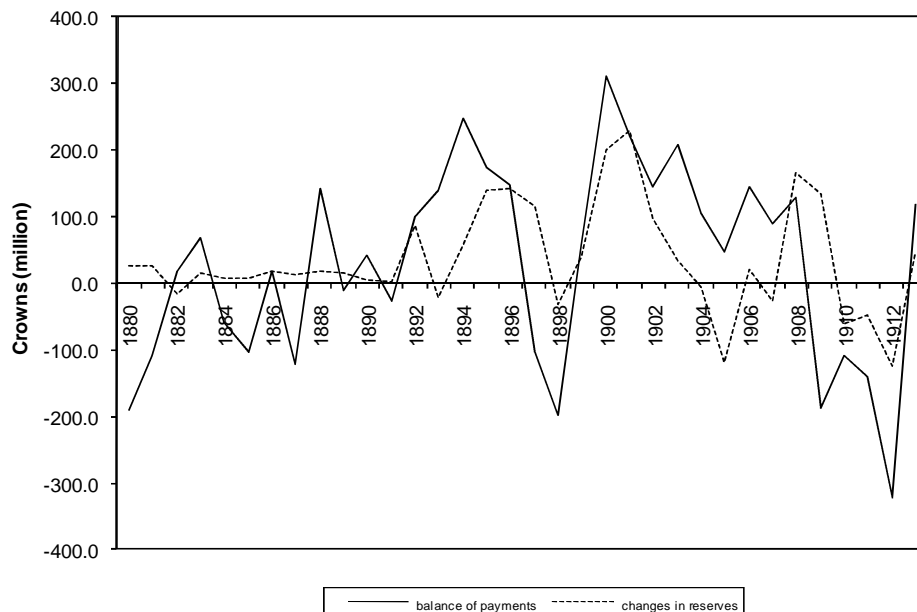Source: Own calculations based on O. Bunzl, *Der Wiener Rentenmarkt*, Vienna 1914, appendix 2.

Figure 6: **Austro-Hungarian balance of payments 1880 – 1913.**

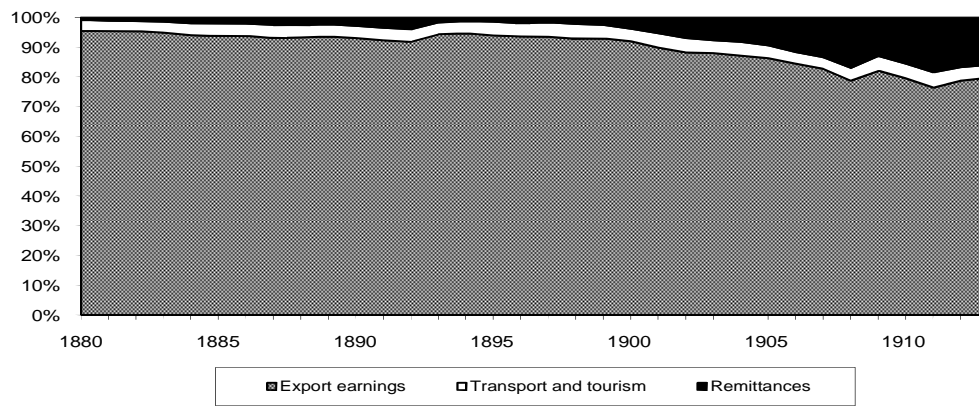Source: Own calculations based on the reconstruction of the Austro-Hungarian balance-of-payments.

Figure 7: **Assets of the Austro-Hungarian balance of payments, distribution in per cent, 1880 – 1913.**

Source: Own calculations based on the reconstruction of the Austro-Hungarian balance-of-payments.

Table 1
24 bonds to represent the Austro-Hungarian government debt

	Name	Currency	Year of first issue	Nominal value in 1892 (million crowns)	Overseas proportion in 1892	Nominal value in 1913 (million crowns)	Overseas proportion in 1913	Amortizable?	Coupon payment abroad?	Coupon payment (CR) or copun renewal (CR)?	number in TzW-1 1893[1]	number in Bartsch 1917[2]
	Joint government debt											
1	4.2% Notenrente	paper	1868[3]	2928.7	23.15	886.2	4.40	n	n	CR	1	1
2	4.2% Silberrente	silver	1868[3]	2007.6	57.12	519.6	13.90	n	y	CR-CP[4]	2	2
3	4% konvertierte einheitliche Rente	paper	1903[5]			3614.3	9.81	n	y	CR		3
	Austrian government debt											
4	4% österreichische Goldrente	gold[6]	1876	954.4	71.81	1168.7	62.70	n	y	CR-CP[4]	7	4
5	4% österreichische Kronenrente[7]	paper	1881	519.3	0.00	2282.4	0.90	n	y	CP	6	5
6	3.5% österreichische Investitionsrente	paper	1897			116.9	20.50	y	n	data of 1st issue		6
7	4.5% österreichische Staatsanleihe für Eisenbahnzwecke	gold[8]	1913			144.4	92.30	y	y	CP		8
8	4% PO Böhmische Nordbahn	gold[8]	1882[9]	*48.0*	94.00	41.3	94.00	y	y	CP		9
9	4% PO Franz-Josef-Bahn	silver	1884[10]	133.7	10.20	115.0	10.00	y	y	CP	16	20
10	4% PO Elisabethbahn	gold[8]	1883[10]	124.1	76.14	110.1	85.50	y	y	CP-CR[4]	26	21
11	4% SSV Elisabethbahn	gold[11]	1880[12]	105.3	70.53	99.2	36.60	y	y	CP	25	22
12	4% PO Karl-Ludwig-Bahn	silver	1890[10]	143.3	16.19	131.9	14.50	y	y	CP	22	23
13	4% SSV Karl-Ludwig-Bahn	paper	1880[12]	92.8	0.00	92.6	24.50	y	y	CR	10	24
14	4% PO Rudolfbahn	silver	1884[10]	137.1	10.45	121.6	7.00	y	y	CP	20	25
15	4% PO Rudolfbahn	gold[8]	1884[10]	67.4	95.23	62.7	95.00	y	y	CP-CR[4]	28	26
16	4% SSV Rudolfbahn	paper	1880[12]	110.1	8.70	105.7	8.70	y	n	CR-CP[4]	19	27
17	3% PO Österreichisch-ungarische Staatseisenbahngesellschaft	gold[13]	1855[14]	*498.1*	94.90	433.0	94.90	y	y	CR-CP[4]		40
18	3% PO Österreichisch-ungarische Staatseisenbahngesellschaft, Ergänzungsnetz	gold[13]	1867[14]	*198.5*	90.10	169.1	90.10	y	y	CR-CP[4]		41
19	4% PO Österreichisch-ungarische Staatseisenbahngesellschaft (Franc)	gold[13]	1900[14]			75.5	96.00	y	y	CR		42
20	4% PO Österreichisch-ungarische Staatseisenbahngesellschaft (Mark)	gold[8]	1883 [10] [14]	*103.2*	97.75	96.2	97.75	y	y	CR		43
	Hungarian government debt											
21	4% ungarische Goldrente	gold[6]	1881	1409.0	85.90	1508.9	70.60	n	y	CP-CR[4]		
22	4% ungar. Kronenrente v.J. 1910	gold				250.0	70.60	n	y	CP-CR[4]		
23	4% ungar. Kronenrente v.J. 1913	gold				150.0	70.60	n	y	CP-CR[4]		
24	4% ungarische Kronenrente	paper		2488.5	4.40	3849.7	5.00	n	y	CR-CP[4]		

[1] Number according to TzW-1 1893, pp. 276-277, table 157.

[2] Number according to Bartsch 1917, pp. 117-128.

[3] The „4.2% Notenrente" is the result of the 1868 consolidation of various paper denominated bonds that had been issued since the early 19th century. Similiarly, the „4.2% Silberrente" is the result of the 1868 consolidation of various silver denominated bonds that had been issued since the early 19th century.

[4] In case sufficient data were available both for coupon payments and coupon renewals, both types of data were used. The first one mentionned refers to the type of data which we consider more plausible. The second one mentionned was included in the sensitivity analysis. Cf. main text.

[5] The „4% konvertierte einheitliche Rente" is the result of the conversion of large parts of bonds (1) and (2) in 1903. This explains why the nominal value of (1) – (3) in 1913 roughly adds up to the nominal value of (1) and (2) in 1892.

[6] Coupon payments were effectuated in Austrian gold florins, Franc, or Mark, depending on the bond holder.

[7] Name since 1893. Prior to the conversion of 1893 the bond was known as „5% österreichische Notenrente".

[8] Coupon payments were effectuated in Mark.

[9] This bond became part of government debt in 1908 due to nationalisation of the railway concerned.

[10] The year refers to conversion rather than first issue. It could not be established when the bond had been issued in the first place. Cf. Compass 21 (1888), pp.42-43. Following the conversion, the bond was full-fledged government debt.

[11] Coupon payments were effectuated in Austrian gold florins.

[12] Terminus ante quem. It could not be established when exactly the bond had been issued in the first place. Cf. Compass 21 (1888), pp.42-43.

[13] Coupon payments were effectuated in Franc.

[14] This bond became part of government debt in 1910 due to nationalisation of the railway concerned.

[15] Figures according to Fellner 1908 and Fellner 1915, cf. appendix 1.

[16] Figures according to various sources, cf. appendix 1.

Table 2: Capital imports into Austria-Hungary, 1880-1913.

	Common debt Paper	Austria Gold	Austria Paper	Hungary Gold	Hungary Paper	Total Gold	Total Paper	Total All bonds
1880-1891	-502.1	163.9	-0.7	80.0	32.1	243.9	-470.7	-226.8
1892-1913	-1379.8	279.5	55.9	671.4	154.9	950.9	-1169.0	-218.1
1880-1913	-1882.0	443.4	55.2	751.4	187.0	1194.8	-1639.8	-445.0

Source: Own calculations based on data described in the main text and the appendix.

Table 3: Balance of payments Austria-Hungary 1880-1913

Year	Balance of trade	Capital imports minus capital exports	Interest payments abroad minus interest payments from abroad*	Remittances	Transport and Tourism	Total
1880	125.0	-63.8	-314.5	11.8	52.0	-189.5
1881	179.4	-43.4	-316.4	17.9	55.0	-107.6
1882	255.4	11.0	-323.1	21.2	55.0	19.5
1883	250.0	74.9	-337.1	23.6	58.0	69.4
1884	157.8	29.3	-334.6	30.5	58.0	-58.9
1885	228.4	-91.5	-331.0	30.3	61.0	-102.8
1886	318.8	-67.1	-325.5	32.2	61.0	19.4
1887	208.6	-109.0	-322.6	37.6	64.0	-121.4
1888	391.4	-25.9	-328.5	41.5	64.0	142.5
1889	354.0	-151.2	-320.2	38.6	67.0	-11.8
1890	321.4	-77.2	-316.3	48.3	67.0	43.2
1891	279.4	-127.1	-308.0	58.8	70.0	-27.0
1892	237.3	34.6	-307.9	67.4	70.0	101.4
1893	326.8	16.0	-306.8	32.1	73.0	141.1
1894	234.1	234.6	-315.6	22.3	73.0	248.4
1895	81.2	326.0	-335.0	25.6	76.0	173.8
1896	178.4	203.5	-348.5	35.6	78.0	147.0
1897	53.5	80.8	-351.7	30.4	84.0	-103.0
1898	4.8	19.6	-357.6	41.9	92.0	-199.3
1899	294.0	-29.8	-358.3	54.3	97.0	57.2
1900	312.7	183.3	-365.7	86.0	95.0	311.2
1901	286.8	67.3	-356.7	119.4	106.0	222.8
1902	229.1	-21.1	-330.2	159.4	108.2	145.3
1903	300.1	-72.3	-325.6	196.8	110.3	209.3
1904	71.0	43.1	-333.2	208.6	116.2	105.6
1905	177.6	-184.7	-325.2	262.5	118.5	48.7
1906	186.7	-196.8	-326.8	361.0	120.1	144.1
1907	70.9	-213.9	-326.3	433.5	124.6	88.8
1908	-77.5	-118.2	-323.4	518.8	129.1	128.9
1909	-346.1	-58.8	-325.1	392.8	150.9	-186.3
1910	-342.2	-114.0	-318.9	510.1	157.8	-107.3
1911	-692.6	76.5	-323.3	626.6	173.5	-139.3
1912	-743.2	-41.6	-330.3	626.2	167.3	-321.6
1913	-521.2	214.2	-336.6	602.1	159.1	117.6

Dividend payments are also included.

Source: Own reconstruction based on data as described in main text and the appendix.